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THE INTERCONNECTION OF HIV, AIDS, AND MALNUTRITION IN THE CONTEXT OF TANZANIA

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ABSTRACT

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By

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Current research on HIV/AIDS, in the context of sub-Saharan Africa, emphasizes the interconnection between HIV/AIDS and nutrition. This research asserts nutrition plays a crucial role in: preventing HIV; prolonging overall health and longevity for people living with HIV; progression of HIV to AIDS; and dramatic escalation to full-blown AIDS.

Highlighting nutrition as an important factor in the acquisition of HIV, AIDS, and progression of HIV to AIDS calls for a rethinking of the AIDS pandemic. This theoretical connection offers hopeful and tangible ways to think about, and devise strategies to combat HIV and AIDS. Implementing intervention and development strategies based on the understanding of a symbiotic relationship of HIV, AIDS, and nutrition is especially needed in the context of Tanzania where HIV seropositivity is 8.1%, and the rate of malnutrition is 41% .

In addition to promoting education on safe-sex practices, providing education on the importance of maintaining overall nutrition and health, as a means to prevent HIV and AIDS acquisition and treat HIV seropositive people, is essential to combating the AIDS pandemic. This thinking humanizes the escalating HIV/AIDS scourge in Tanzania, and in other countries severely affected by the HIV/AIDS pandemic and malnutrition. Furthermore, this thinking assists in de-stigmatizing HIV/AIDS and restoring dignity to people living and dying with a health condition, commonly associated with socially and culturally immoral behavior.

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Chapter 1: Background Information

This thesis represents a culmination of over two and a half years of research on the HIV and AIDS pandemic in sub-Saharan Africa, specifically in the context of Tanzania. My thinking and analysis reflect insights gathered through literary review, and approximately ten months of lived experience and research in Tanzania, throughout the period of June 2001 to January 2003. Before elaborating on my research findings, it is first necessary to explain some factors which influenced my decision to pursue the study of anthropology, and conduct research on HIV and AIDS in the context of Tanzania, in sub-Saharan Africa.

After my first semester of graduate school in the Department of Anthropology at Michigan State University, I started to seriously contemplate a research focus. Deciding on a geographical focus was not difficult. Before entering the program, I decided I wanted to conduct anthropological research in East Africa. As an undergraduate student, I spent six months in Kenya and my experiences there whet my interest to return to this part of the world, and continue studying Kiswahili, anthropology, and issues of development. I chose to study anthropology at Michigan State University because of the opportunities available to pursue my interests. My decision was also heavily influenced by the opportunities available for Kiswahili training. It is very important to me as an aspiring anthropologist to acquire the linguistic skills necessary for effective, and independent language communication and comprehension.

Deciding on a topical focus was somewhat more challenging, for I knew this decision would greatly influence and pattern my future career and life plans. I wanted to choose a topic that was interesting and challenging, and

something that I was passionate about, and dedicated to following. I also wanted to focus on a topic that was timely, in need of research, and that would somehow benefit humanity.

What attracts me to the field of anthropology is a fascination with human behavior, and a desire to travel, learn different languages, and attain cultural understanding. But that is only part of the reason I choose to study anthropology. Out of all fields, anthropology is the most holistic; encouraging and demanding a cross-disciplinary approach to the study and comprehension of human behavior, through time and space. With an emphasis on eliciting human understanding, anthropological training is in essence, geared towards deconstructing stereotypes, generalizations, and ignorance that encode and mystify the roots of racism, oppression, and injustices in the world. Anthropologists are intermediaries, translators, and transmitters of cultural meaning. Therefore, anthropologists play important roles in unraveling and combating stark issues of oppression, racism, and injustice, and building human understanding and tolerance. (See: Deitrick 2002, Wolf 2002).

From my experiences as an undergraduate student, I was deeply affected by issues of "poverty" that affect Kenya such as: a widespread lack of running water, electricity, access to medical care, and opportunities for education; and chronic and endemic disease, famine, and drought. Similar to my childhood bewilderment over how and why forms of racism, oppression, and hatred start and are perpetuated, I was troubled as to how and why "poverty" disproportionately plagues Kenya, and other countries in the so-called "third world".

The AIDS pandemic is the biggest and most contemporary example

illustrative of how "poverty" and rights to existence disproportionately affect regions of the world. (See: Farmer 1992, 1999a, George 1988, Hornborg 2001, Pieterse 2001, Sen 1981, Setel 1999, Watchtel 2001, Watts 2001, World Bank 2000). I decided to focus on the topic of AIDS because of my intrigue and passion for understanding and eliciting why, HIV and AIDS predominately discriminate against the geopolitical "poor" of the world, and how sub-Saharan Africa became the epicenter of the pandemic. (See: Bonds 2002, CDC 2002h, Farmer 1996, Green 2002, HIV InSite 2002, Morahan 2002, PCHPA 2002, Reid 1997, Setel 1999, The Courier 1998, USAID 2002a, b, Wolf 2002).

In 2001, I was granted the opportunity to spend approximately seven months in Tanzania. The purpose was to study Kiswahili, attend Sokoine University of Agriculture for one semester, and conduct preliminary research on HIV/AIDS. Before leaving, I read as much as I could about HIV/AIDS in the context of sub-Saharan Africa and specifically, Tanzania. Very much influenced by the articles and books I read, I left for Tanzania with the belief, notion, and hypothesis in mind that asymmetrical gender relations and *promiscuity* constitute the causes and effects of "poverty", and the pathogens of the AIDS pandemic (Akeroyd 1996, Ballard 2001, Berer 1993, Bonds 2002, Farmer 1992, 1999a, FAO 2001i, Mwale 1992, NIAD 2001a, Roth and Hogan 1998, Setel 1993, 1999, Swezey 1993, The Panos Institute 1990a, b, Whelan 1999, Wignaranja 1990). At that time, I did not question if there was a deeper, or different explanation to the high prevalence of HIV/AIDS in Tanzania. I assumed the abundance of biomedical and socio-cultural research on the subject asserting a causal relationship between HIV and AIDS, and the gendered dimension of the epidemic were "correct", and served the basis from which my

research would logically emanate. In other words, I believed that the human immunodeficiency virus (HIV) inevitably follows a linear path to the acquired immune deficiency syndrome (AIDS). Furthermore, I believed that women are most vulnerable to HIV/AIDS because of their subordinate role in society, which puts them at risk, biologically and socially.

However, my experiences in Tanzania made me question the dominant thinking and ideologies used to explain the epidemiology of the pandemic, and how and why HIV/AIDS disproportionately affects certain risk groups. One of the taken for granted concepts I began to question is *promiscuity* (See: Hornborg 2001, on "defamiliarization"). To elaborate further, the socio-cultural research on HIV/AIDS mirrors the dominant biomedical thinking, which asserts that HIV causes AIDS, and is predominately spread through heterosexual transmission in the context of Tanzania, and sub-Saharan Africa (USAID 2002a, b, World Bank 2000). Socio-cultural research reflects the biomedical theorization of the cause and spread of HIV/AIDS, and is premised on elucidating African sexuality, and highlights cultural, and "poverty" induced, sexual behaviors and relationships (Baylies *et al* 2000, Farmer 1996, 1999a, Feldman 1990, Green 2003, Herdt 1997, McCombie 2003, Parker 2001, Schoepf 2001, Setel 1993, 1999, Suggs and Miracle 1993, Van De Wijgert and Helena 1997). The biomedical and socio-cultural research influences, and is reflected in HIV/AIDS prevention, intervention, and treatment programs in sub-Saharan Africa, and focuses primarily on promoting cultural and sexual behavioral changes (World Bank 2000). Furthermore, "widespread acceptance of multiple sex partnerships", or *promiscuity*, is viewed as a major hindrance to Tanzania's national response to HIV/AIDS (USAID 2002a:3).

I started to wonder, what defines *promiscuity*? This concept is alluded to in biomedical and socio-cultural literature on HIV/AIDS to explain the high prevalence of AIDS in sub-Saharan Africa, but what does it really mean? What and whose standards are used for judging a society and culture more promiscuous, or generally accepting of multiple sex partnerships, than another society and culture? What are the implications for labeling a group of people as such? How do researchers actually obtain data on *promiscuity*? How does *promiscuity* relate to, and intertwine with issues of power, authority, patriarchy, and "poverty"? What are my ethical responsibilities and boundaries as an anthropologist, in portraying an interrelationship among HIV, AIDS, and *promiscuity* in Tanzania? (See: Parker 2001, Schoepf 2001, Wolf 2002).

While in Tanzania in 2001, I realized the difficulty in conducting research on AIDS. I wondered how to successfully and responsibly conduct research on a very sensitive topic; a health condition widely believed to be perpetuated by issues of "poverty" and "promiscuity"? Attempting to attain an understanding of the bio-social dimensions of the illness necessitates asking sensitive, personal, and in general, uncomfortable questions about peoples' sexual behavior. Furthermore, discussing these issues is generally, perceived to be culturally and socially taboo (Baylies *et al* 2000, Setel 1999). I found it personally uncomfortable and at many times, out of place for me as an outsider, to ask such personal questions (Foster 2002). I realized I could choose to avoid asking such questions and expound off of other researchers' assertions about sexual behavior, "promiscuity", and the spread of HIV/AIDS in Tanzania. However, how ethical and responsible is it to unquestioningly propagate research and knowledge, especially if I desire to somehow make a

contribution to the field of anthropology, research on AIDS, and humanity (Wolf 2002)?

From my experiences and quandaries, I learned that *time* is essential to conducting and producing successful and responsible anthropological research on HIV/AIDS in Tanzania. I realized the necessity of spending time living in Tanzania in order to attain an understanding of the regions, societies, cultures, and groups of people that I am investigating, writing about, and basing my professional career. Time is essential to achieving a high level of fluency in Kiswahili, which is fundamental to understanding cultural, social, and linguistic nuances. Furthermore, fluency in Kiswahili is crucial for effective comprehension and communication of the sensitive, emotional, and personal dimensions constituting the AIDS pandemic. (See: Hannoum 2002, McCombie 2003, McCreery 2002, Shreeve 2002, Tihanyi 2002, Werner 2002, Wolf 2002).

While in Tanzania in 2001, I spent time trying to understand why certain regions, such as the "third world", and social groups, such as the "poor", are at higher risk for AIDS than others. I continued to read ethnographic accounts portraying the interconnection of disease, HIV/AIDS, and "poverty" (Farmer 1992, 1999a, Setel 1999). I also tried to maintain as fertile a mind as possible and not assume too much. I immersed myself in my environment in order to get a better understanding of Tanzanian society, and the ways issues of AIDS are communicated through newspapers, radio, television, commercials, billboards, and by religious groups and development organizations. I tried to learn as much as I could about Tanzanians' perceptions of AIDS, "promiscuity", sexuality, and who within Tanzanian society was socially deemed to be most at risk, and why. I also started paying attention to other factors in Tanzania that

contribute to "poverty" (Foster 2002). The issues that were continually discussed in newspapers, local, national, and international news broadcasts, and by friends and people I talked to include: chronic and endemic health conditions such as malaria, tuberculosis, parasitic infections, typhoid, and cholera; food insecurity; and lack of access to hospital facilities, and medicines (Foster 2002) (See also: Farmer 1999a).

I remember walking down the street one day in Morogoro town, just after reading another grave report on the AIDS epidemic in sub-Saharan Africa, and asking myself, why is the HIV virus so lethal within specific groups? What makes the HIV virus itself so imminently deadly? Why is it that people in other regions of the world are generally more equipped to repel HIV infection and combat AIDS, whereas others are not? What is the relationship between an individual's health and HIV infection? What is the connection between "poverty" and the immune system (Foster 2002)?

Though I am not a doctor nor have training in medical anthropology, I know from personal experience, common knowledge, and from field research in Tanzania that there is a symbiotic relationship between overall health and susceptibility to disease. For example, many times when people fall sick in Tanzania, it is common to be affected by a few illnesses at once, such as a combination of malaria, amoebas, typhoid, and worms. It seems that bouts of malaria and typhoid for example, increase susceptibility to other illnesses, especially if not treated quickly and efficiently. When I would fall ill with malaria and recover relatively quickly without need for hospitalization, I was reminded by doctors and friends, that I was lucky to have malaria prophylaxis which prevent me from falling severely ill. I realized that many people without access to health

facilities, medicine, and adequate amounts of safe food and water, in general, fall quickly and severely ill, and often die from, common treatable illnesses. One of the gravest and ironic realizations from my experience in Tanzania in 2001, is that I am able to prevent and protect myself through inoculations and prophylaxes obtained in the United States, from illnesses most responsible for causing death in Tanzania, sub-Saharan Africa, and elsewhere in the "third world" (Foster 2002, See also: Farmer 1999a).

When I came back from Tanzania in January 2002 I found myself feeling angry and defensive of the way the AIDS pandemic was portrayed in Africa. It seems that Africa has been neutralized as the receptacle of the AIDS pandemic. Moreover, the general consensus from people I talked to about AIDS in Africa believed that AIDS is so prevalent there, because Africans are somehow "culturally backward", "oversexed" and "promiscuous." This made me realize that there are serious and dangerous social, cultural, racial, and ethical implications of HIV/AIDS research that is premised on sexuality issues (See: Parker 2001, Salzman 2002, Schoepf 2001, Wolf 2002).

It is very troubling to realize that some parts of sub-Saharan Africa have HIV rates as high as 25-35% (World Bank 2000). It is troubling to realize that AIDS disproportionately affects specific populations of people in all societies, whether "first" or "third" world (Aguirre and Turner 2001, Bonds 2002, Farmer 1992, 1996, 1999a, 2002, Green 2002, Henrici 2002, Herdt 1997, Kim *et al* 2001, Morgen 2002, Root-Bernstein 1993, Rothenberg 2001). Why are the socially deemed "poor" most susceptible to HIV infection and AIDS acquisition? Why is it the "poor" who seem to die very quickly after diagnosis, whereas the more socially prosperous or less "poor", in any context, generally survive longer

and live a more dignified life? (See: Nature 2003). How relevant is the issue of "promiscuity" when medicines and treatments for HIV and AIDS exist, but are generally out of reach for a majority of people in the world in need? How does labeling a society "promiscuous" and "poor" socially, morally, and politically justify the intangibility of obtaining necessary medicines to treat HIV and AIDS? (See: Wolf 2002).

Another issue I started to think about heavily while in the field and more so upon returning, is what is the power of stigmatizing a health condition like AIDS, as a "disease" of "promiscuity", or weak moral character? To what extent has the AIDS epidemic in sub-Saharan Africa become a social pandemic premised on fear, ignorance, and racism, due to the dominant ideology that asserts it is a sexually transmitted infectious "disease" prevalent among the geopolitically "poor"? (See: Baylies *et al* 2000, Farmer 1992, 1999a, Parker 2001, Schoepf 2001). What are the psychosomatic effects of being diagnosed with such a "disease"? How does knowing that you will inevitably die from a wasting syndrome affect one's ability and will to endure life? How does knowing you are "poor" and most likely unable to obtain medicines only the "rich" have access to, affect people's hope and outlook on life? What *can* be done so that the "poor" can prevent and treat HIV infection, and progression to AIDS?

In 2002 I was granted another opportunity to return to Tanzania and conduct preliminary research on AIDS. I intended to conduct research on the interface between the aim and impact of development organizations focused on eradicating and alleviating HIV/AIDS. I planned to interview people working for the development organization, as well as intended beneficiaries living in the

community. Before leaving for Tanzania, I communicated with the directors and associates of three development organizations and made plans to collaborate with each. However, due to time constraints and the unanticipated expectation to pay over $1000 to conduct research with an American organization, I collaborated with one development organization.

It was necessary to change the focus of my research to suit the nature of this specific organization. The organization focuses primarily on assisting HIV/AIDS widows; women whose husbands died from AIDS. Many of the women are infected with HIV. All of these women have dependents; their biological children and/or relatives' children, many who are orphaned by HIV/AIDS. I was informed by the director and members of the development organization that the biggest challenge widows face is obtaining enough income to sustain their families. The director of the organization thought that it would be particularly beneficial for me, as well as the organization, to interview widows living in town, as well as widows living in a rural village a few hours away. He told me the situation for HIV/AIDS widows is more challenging in the rural area than the town, because HIV/AIDS rates are high, and there is a comparative lack of health care facilities, money, medicine, and food security (Foster 2002).

I decided to interview widows living in town, and in the rural village, and ask questions related to the challenges and struggles they face on a daily basis. When I attempted to conduct this research in the rural area, I was informed that it would be first necessary to meet the chief of the village. I did so but did not realize until I started my first interview that he, along with four people from the development organization, would be present through the entire

interview session. This was a frustrating and uncomfortable experience for me, as well as for the person I interviewed. Though she seemed eager to talk to me about her life, and daily challenges, she and I were both constantly interrupted by members of the organization and chief of the village. Though I believed they were somehow trying to assist us in our questions and answers because of the language barrier, I found the interview situation to be very uncomfortable for me, as well as the woman I was interviewing. Due to the circumstances, I decided it was unethical for me to continue my research in this manner, and ask HIV/AIDS widows questions about their personal struggles, and lives, in front of an audience of five people (Foster 2002).

When I returned to town, I met with an organized group of approximately 40 HIV/AIDS widows (many who are living with HIV and AIDS) in the town of Bukoba, to learn about their lives and the challenges they face in providing for themselves and their dependents. This turned out to be a much better experience. The interaction was organized in an open forum. I introduced myself to them in Kiswahili and expressed that I was conducting research on *uhusiano baina ya masuala ya chakula, afya, na ukimwi,* or the relationship among issues of food, health, and AIDS. I expressed to the women that I was interested to learn about their daily struggles, and lives. I told them that I was interested in listening to them; that anything that they wanted to say about these issues was important to me, and research on HIV/AIDS. (Foster 2002).

I was very surprised, because despite the heaviness of the issues, the interaction flowed well. Many women were very apt to talk about their lives and in fact, seemed quite eager to express their frustrations, worries, fears, and personal struggles. It was an incredibly important experience, because I

realized the difficulties and challenges most of these women face on a daily basis. Honestly, it was also quite a moving, and painful experience because many women outwardly displayed their expressions of emotional, physical, and psychological pain of living with, suffering, and being widowed by HIV/AIDS. There were a few women who at first, seemed reticent. However, as time progressed, each and every woman had expressed themselves, stating their worries, fears, heartaches, and desperation. (Foster 2002).

All stated, or agreed with those who did, that obtaining enough nutritious food on a daily basis to feed their children and themselves was a constant daily struggle. They mentioned they had to choose whether to buy food, pay school fees for their children, or attend the hospital when they or their children are sick. Most widows, if they could secure enough money to send their children to school, chose this option and tending to their children's health and needs, over their own. Many mentioned that often their children attended school having hunger, or *njaa*. Many women stated that often they did not eat, so that they could feed their children. Many expressed and wondered, *what was the point of sending their children to school, if they went to school hungry? How can they think and learn having 'njaa', or hunger?* (Foster 2002).

Many women mentioned that it is particularly problematic when they fall sick, because it often takes a long time to recover, especially without access to health care and medicine. Many mentioned that falling ill was one of their greatest fears, because they believed that an onset of illness would inevitably lead to full-blown AIDS, and death. Their greatest fears include not being able to provide enough food, pay school fees, and ensure a secure future for their children. (Foster 2002).

Concerning the issue of "promiscuity" I learned from the woman I interviewed in the rural area, and from the widows' group in town, that women are very vulnerable to HIV and AIDS for several reasons. First of all, women in general are not able to demand their husbands or sexual partners to wear condoms. In many instances, if women insist that their partners wear condoms, they are looked at as being "promiscuous" and unfaithful. Often, women do not have the choice to abstain from sex, and if they try to, are sometimes physically beaten. Often HIV infected women are castigated and stigmatized in the community as "promiscuous" and sometimes, they and their dependents are refused assistance from relatives. Many widows informed me that struggling to procure food and daily essentials leaves them very vulnerable to HIV and AIDS because as the sole financial provider, they are not able to sustain themselves and their dependents. These situations, I was told, sometimes force women into "promiscuous" behavior, such as unprotected sex, and prostitution. (Foster 2002).

Before leaving Tanzania in the summer of 2002, I attended a week long conference in Dar es Salaam focused on nutrition and HIV/AIDS. The conference was attended by approximately thirty nutritionists and dietitians from various countries in sub-Saharan Africa. All presented theoretical data and case-studies illustrating the role of nutrition in HIV and AIDS acquisition. The most important information I obtained from participating in this conference is that HIV does not have to follow a linear path of progression to AIDS. In other words, nutrition plays a crucial role in preventing HIV infection, prevention of opportunistic infections associated with HIV, and AIDS, and progression from HIV to AIDS. Furthermore, there are practical ways for "poor" people who lack

access to health care and expensive medicines, to prevent and treat HIV, and opportunistic infections that compound progression to AIDS (Egal and Valstar 2002, Kean *et al* 1999a, b, c, d,e, f, g, Lwanga 2001, Piwoz and Preble 2001).

In many ways, the information I obtained from the conference in Dar es Salaam marks a pivotal point in my academic research and career. The information I obtained first-hand from nutritionists and dietitians on the symbiotic interrelationship of nutrition and HIV and AIDS acquisition, provides explanations to some of my personal reflections and queries. I started to make sense of why HIV and AIDS rates are so prevalent in the context of Tanzania, sub-Saharan Africa, and other "poor" countries where malnutrition rates are exceedingly high, and access to medical treatment is unattainable for a majority of the population. This information highlights malnutrition as an important factor underlying "poverty", and the interconnection of "poverty", "promiscuity" and HIV/AIDS in Tanzania, sub-Saharan Africa, and among the "poor" in the world. This interconnection provided me a different way to think about, and approach research on HIV/AIDS. Most importantly, this interconnection encourages practical ways to address the pandemic, through the implementation of prevention, intervention, and treatment strategies that consider the interconnection of nutrition and acquisition of HIV and AIDS. In all, the information obtained from this conference, motivated me to move from reflexivity to a path of investigative query (Salzman 2002, E-Mail to author, April 5 2003), and seek biomedical theorizations of HIV and AIDS, which consider aspects of food insecurity and malnutrition, in the pathogenesis of HIV infection and AIDS.

Structure of Thesis

The remainder of the thesis is divided into four chapters. The following chapter, Chapter 2, explains HIV and AIDS pathogenesis according to two theories: the dominant theory which asserts that HIV follows a linear path of progression to AIDS; and the co-factor theory, which asserts the pathogenesis of HIV to AIDS follows a non-linear path of progression, and considers the role malnutritions plays in HIV/AIDS pathogenicity. Chapter 3, defines and explains malnutrition on a global scale, and more specifically, contextualizes malnutrition as a pervasive challenge in "poor" countries, such as Tanzania. Chapter 4, portrays the interconnection of history, "poverty", malnutrition, and HIV and AIDS, in the context of Tanzania. The Conclusion, reiterates the major points and arguments of the thesis, and suggests points for further thinking, and research on the HIV/AIDS pandemic.

Chapter 2: Two Theories of HIV/AIDS Pathogenesis

HIV Causes AIDS

According to the Center for Disease Control and Prevention (CDC) and dominant thinking, the human immunodeficiency virus (HIV) causes the acquired immunodeficiency syndrome (AIDS) (CDC 2002d). The virus is transmitted through body fluids: blood, semen, vaginal fluid, and breast milk. HIV is primarily transmitted through blood-to-blood and sexual contact. Infected mothers may transmit the virus to infants during pregnancy, delivery, and through breast feeding. The virus is also transmittable through other body fluids such as cerebrospinal fluid surrounding the brain and spinal cord, synovial fluid surrounding bone joints, and amniotic fluid surrounding the fetus. Health care workers are most at-risk for contracting the virus through these fluids. (CDC 2002g).

The acquired immune deficiency syndrome (AIDS) was first recognized in 1981. The human immunodeficiency virus (HIV) was recognized as 'the virus that causes AIDS in 1983' (CDC 2002e). HIV is believed to lead to the destruction of the immune system by progressively destroying and impairing cells vital to a properly functioning immune system. More specifically, HIV is said to impair CD+4 T helper cells; cells crucial to maintaining the immune system and fighting infections. (CDC 2002e).

Because HIV works by *progressively* impairing cells vital to the proper functioning of the immune system, many people carry HIV and live asymptomatically for years before developing the acquired immune deficiency syndrome (AIDS) (CDC 2002c). Studies shows a "near-perfect correlation"

between the ratio of blood viral load and CD+ 4 T cell numbers; the higher the level of HIV in the blood, the lower the number of CD+ 4 T cells (CDC 2002e: 1). Thus through time, as the viral load increases so does the destruction of the immune system, inability to fight opportunistic infections, and progression to AIDS (CDC 2002c).

In the context of Tanzania, research asserts HIV is primarily transmitted through heterosexual intercourse, and from mother to child during pregnancy, delivery, and breast feeding (Baylies *et al* 2000, CDC 2002d, e, g, HIV InSite 2002, Setel 1993, 1999). Research asserts HIV is also transmitted through contaminated blood through blood transfusions, and medical equipment (Piwoz and Preble 2000).

For Tanzanian adults, HIV is believed to be primarily transmitted through heterosexual intercourse. Research asserts approximately ten percent of Tanzanian adults are infected with HIV. Females are most susceptible to contracting the human immunodeficiency virus (HIV), due to social and biological reasons. In addition, research demonstrates twenty-five to forty-five percent of HIV infected women who breast feed transmit the HIV virus to their infants. Approximately twenty percent of HIV transmission from mother to child occurs during pregnancy, and eighty percent through extended breast feeding, which commonly lasts until the infant is twenty-four months. To elaborate further, approximately five to ten percent of mother to child transmission (MTCT) occurs during pregnancy; ten to twenty percent during delivery; and ten to twenty percent occurs through the course of twenty-four months of breast feeding. (Piwoz and Preble 2000:5).

Dominant theories assert after HIV infection, the virus follows specific

phases of pathogenesis. These theories claim the phases of pathogenesis are standard to all regions of the world and for all HIV infected individuals. However, intervals between phases are generally shorter in "developing" countries than industrialized countries (Bartlett and Finkbeiner 1998, Piwoz and Preble 2000). This suggests that there may be factors other than "promiscuity" which affect the pathogenesis of HIV and AIDS.

Phases of HIV Infection

There are five recognized phases of HIV including: acute infection, seroconversion, asymptomatic period, early symptomatic infection, and late symptomatic infection. These phases are believed to follow a teleological path of immunological destruction and progression to AIDS. The descriptions of the following phases are adopted from Piwoz and Preble (2000).

Acute Infection

This first phase of HIV infection is known to be responsible for causing symptoms of acute infection, such as body aches and fever. These symptoms usually disappear from one to six weeks after HIV infection. At this stage viral load, or concentration of the virus in the blood, is high. Viral load and rate of transmission share a direct relationship, therefore if viral load is high, the rate of transmission is also high. For example, if a woman is pregnant or breast feeding at the time of HIV infection, there is a high risk of transmitting the virus to the fetus and child, respectively. Similarly, there is a high chance of transmitting the HIV virus through unprotected sexual intercourse during this phase.

It is important to note that during the phase of acute infection, the body does not produce antibodies responsible for fighting HIV infection. Therefore, standard HIV antibody tests will not detect HIV in the blood, and will produce negative results to HIV during the period of acute infection.

Seroconversion

The onset of seroconversion generally begins six to twelve weeks after HIV infection. Seroconversion refers to the phase when the body begins to produce HIV antibodies which are detectable in the blood. At this stage, infected adults will test positive for HIV infection.

It is important to note that pregnant mothers transmit their immune system to the fetus during pregnancy. Thus, infected mothers can transmit HIV antibodies to infants. Infants retain the mother's immune system for approximately twelve to fifteen months. Therefore, HIV antibody tests are not accurate in detecting HIV infection in infants until after they have produced their own immune systems. If infants are tested before this time, HIV antibody tests can result in false positives because not all infants will contract the HIV virus and seroconvert.

Asymptomatic Period

This stage refers to the period when an HIV infected person lives asymptomatically, or without symptoms of HIV. This phase can last for several years. During this time, HIV infected individuals generally feel healthy. However, though the person appears symptomless, the immune system is affected by the virus. For example, CD+4 T lymphocyte counts decline during

this period. This means that the immune system of HIV infected individuals gradually declines, increasing vulnerability and susceptibility to infections and health conditions.

Early Symptomatic Infection

This stage marks the point when the "first symptoms of a weakened immune symptom occur" (Piwoz and Preble 2000:4). During this phase HIV infected individuals are very vulnerable and susceptible to infections, and commonly experience health conditions such as: fever, weight loss, chronic diarrhea, chronic fatigue, bacterial pneumonia, tuberculosis, excessive bruising and bleeding, and fungal infections. This period can last from several weeks to several months. It is not uncommon for HIV infected individuals to experience multiple concurrent infections and health conditions during this stage.

Late Symptomatic Infection

This stage officially refers to the condition known as the acquired immune deficiency syndrome, or AIDS. The onset and stage of AIDS is determined by a blood test that "confirms" a decreased number of immune cells, such as CD+4 T lymphocyte cell counts lower than 200 (Piwoz and Preble 2000:4). Blood tests also detect the "presence of other severe complications" at this time (Piwoz and Preble 2000:4). The immune system is severely depressed during this stage, as reflected by the low number of immune cells vital to fighting infection. Consequently, susceptibility and vulnerability to infections and health conditions are high. Viral load and

transmission rates are also high during this phase and progressively increase, as immunological function decreases.

Important Note

The average time period between HIV infection and progression to AIDS is approximately eight to ten years in industrialized countries. However in "developing" countries, such as Tanzania, the time period between HIV diagnosis and death is significantly lower, and commonly reported to be six months. The shortened period between diagnosis and death in "developing" countries is attributed to exposure to pathogens and infectious diseases, lack of health care, and high prevalence of malnutrition; not "promiscuity" (Grant *et al* 1997, Greenberg *et al* 1998, Morgan *et al* 1997, Piwoz and Preble 2000, See also: Nature 2003).

What Doesn't the Causal Theory Explain?

According to dominant thinking of HIV/AIDS, HIV is necessary and sufficient to cause AIDS (CDC 2002c, d, e, f, g, NIAD 2001b, c). This means that HIV is the sole causative agent of AIDS. Therefore, once infected with HIV, an eventual yet impending linear path of immuno-destruction and progression to AIDS follows, leading to death (CDC 2002c, d, e, f, g).

As mentioned previously, socio-cultural literature on the AIDS pandemic in Tanzania reflects the dominant biomedical thinking of a causal relationship between HIV and AIDS. Socio-cultural research on HIV/AIDS primarily focuses on gender, sexuality, and "poverty" (Baylies *et al* 2000, Setel 1993,1999). These accounts assert that asymmetrical gender relations and "promiscuity"

constitute the causes and effects of "poverty", and pathogens of the AIDS pandemic in Tanzania (Baylies *et al* 2000, Setel 1999, See also: Farmer 1992, 1996, 1999a). Furthermore, this ideology is used to explain the high prevalence of HIV and AIDS in sub-Saharan Africa, and other "third world countries" severely affected by the pandemic.

HIV/AIDS prevention and intervention strategies in Tanzania reflect this ideology, and are primarily premised on the "dissemination of HIV/AIDS behavior change communication information" and promotion of male and female condoms (USAID 2002b:1). However, despite years of concerted effort by a myriad of researchers, donors, doctors, and humanitarian and development organizations focused on combating HIV and AIDS, rates are increasing (PCHPA 2002, World Bank 2000). The dominant causal theory fails to explain why, despite intervention and development strategies, HIV and AIDS rates are increasing.

Are HIV/AIDS rates increasing because Tanzania is a "poor", "third world" country? Is it because Tanzanians are "promiscuous"? Again, what are the implications for labeling a society as such? How do the labels and assumptions, "poor", "third world" and "promiscuous" bias research on the socio-biological topic of AIDS? What do these labels presuppose? Most importantly, what is being glossed over and dismissed in AIDS research?

Despite the fact that a majority of biomedical and socio-cultural research on AIDS is premised on, and continues to adhere to the HIV causes AIDS theory, the CDC maintains, "although the scientific evidence is overwhelming and compelling that HIV is the cause of AIDS, the disease process is not yet completely understood" (CDC 2002d:2). This statement suggests there is still

much more to learn about the pathogenesis of HIV and AIDS.

It is known that the time periods between HIV diagnosis and progression to AIDS, and progression from AIDS to death, are much shorter in "developing" countries than in industrialized countries. Furthermore, it is believed that factors responsible for this disparity include "exposure to pathogens and infectious diseases, poor health care, and malnutrition" (Grant *et al* 1997, Greenberg *et al* 1998, Leonard-Green and Watson 1989, Morgan *et al* 1997, Piwoz and Preble 2000, See also: Nature 2003). Despite this knowledge, little research on HIV and AIDS, and intervention, prevention, and treatment strategies to combat HIV and AIDS focus on these critical issues.

Is it possible that the pathogenesis of HIV and AIDS follows a non-teleological path to immuno-destruction? If so, how do malnutrition, lack of access to health care, and exposure to infectious pathogens influence HIV and AIDS acquisition, and progression from HIV to AIDS, and AIDS to death? How would a more holistic and complex understanding of HIV and AIDS pathogenesis that includes these factors implicate the HIV/AIDS challenge in Tanzania in terms of prevention, intervention, treatment, and research?

After returning home from conducting preliminary research in Tanzania in summer 2002, I decided to research the biomedical dimensions of HIV and AIDS in an attempt to quell some of my personal queries as to why certain people in the world are more infected and affected by HIV and AIDS. The theoretical information I found was surprising and optimistic. Indeed there are alternative theoretical explanations that provide more complex, non-linear, and holistic understandings of the AIDS pandemic. These theories explain why certain people are more at risk than others in the world, and within any society,

and supply explanations as to how "poverty" affects vulnerability and susceptibility to infectious diseases, including the human immunodeficiency virus (HIV). In addition these theories explain how common and chronically experienced illnesses endemic to Tanzania for example, compound the proper functioning of the immune system through time and increase risk of contracting HIV, and once infected, progression to AIDS. The co-factor theory is an example of such a theory.

Co-factor Theory

The co-factor theory espoused by Dr. Root-Bernstein asserts the human immunodeficiency virus (HIV) is necessary but not sufficient to cause the acquired immune deficiency syndrome (AIDS) (Matthews 1997, Root-Bernstein

1990, 1992, 1993[1], 1995, 1997, 2002). This means that although there is a strong correlation between HIV and AIDS, HIV does not act alone in causing AIDS (Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2000). This theory claims there are various co-factors, or infectious or non-infectious agents which activate T-cells, and increase a person's chance of becoming infected with HIV. Furthermore this theory claims that co-factors play an important role in the progression of HIV to AIDS.

In Root-Bernstein's words, "the critical feature of co-factors is that they must be at work on the individual concomitant with exposure to an infection with HIV" (Root-Bernstein 2002:2). This means that the immune system must be under attack by an antigen to allow infection and replication of the HIV virus. If

[1] Root-Bernstein's book, *Rethinking AIDS* (1993), outlines theoretical explanations alternative to the HIV causes AIDS paradigm to explain the relationship and pathogenesis of, HIV and AIDS. He supports the co-factor theory most, and asserts that HIV is necessary but not sufficient to cause AIDS. He argues that there is not enough evidence to prove that HIV is the sole cause of AIDS, and calls for a "rethinking" (Root-Bernstein 1993). Among the six critiques/reviews found for this book, one states that the Root-Bernstein's work is "specious", based on his claim that the overall state of the immune system serves as a precondition to HIV acquisition (Jones and Curran 1993). In the same review, he is criticized for claiming that HIV is not a cause of AIDS (Jones and Curran 1993:80). Root-Bernstein's retort to this review is, he does not claim that HIV is not a cause of AIDS, rather that there is not enough evidence to support that HIV is the sole cause of AIDS (Root-Bernstein 1994). His book is criticized for "lacking scientific rigor', being largely a theoretical work, not having been "peer-reviewed", and written in an "unconventional format" (Cotton 1994). The author of this critique states that despite the weaknesses of the book, it is useful for those involved in AIDS research (Cotton 1994). In another review, the author states that though he believes HIV is the 'cause' of AIDS, "every scrap of improved and sharper knowledge will pay dividends in ways yet unthought of" (Joseph 1993). The author also states, "Root-Bernstein is right: there is a tragic cost to premature consensus" (Joseph 1993). Another reviewer states this book "merits serious consideration", primarily because Root-Bernstein highlights the "paradoxes in the natural history and epidemiology of AIDS", and gaps in the knowledge of AIDS (Rothberg 1993). The same author states that though Root-Bernstein's work is a bit repetitious, "it is extensively researched and documented", and "should not be ignored by those who want a full understanding of AIDS and how to deal with it" (Rothberg 1993). In the other two critiques, Root-Bernstein is merited for considering and highlighting the state of the immune system as a precondition to HIV acquisition, and in the pathogenesis of HIV to AIDS (See: Schuklenk 1993, Verghese 1993).

the immune system is functioning properly and not defending foreign bodies, or antigens, the immune system is capable of preventing HIV infection and replication, and progression from HIV to AIDS (Matthews 1997, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2000).

Examples of co-factors that affect the acquisition of HIV, AIDS, and progression from HIV to AIDS include: viruses; bacteria, such as sexually transmitted diseases (STDs); parasites, vaccines; alloantigens (sperm and blood); immunomodulatory drugs; and malnutrition (Root-Bernstein 2002:1-2). In accordance with this theory, people suffering from health conditions endemic to, and commonly and chronically experienced in Tanzania, such as malnutrition, malaria, typhoid, tuberculosis, parasitic infections, and diarrhea, are more susceptible to contracting HIV. Likewise, people infected with HIV and commonly and chronically affected by these health conditions are more vulnerable to developing AIDS (Leonard-Green and Watson 1989, Matthews 1997, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2000).

Complexity

This theory supports a non-linear progression from HIV to AIDS as opposed to the dominant causal theory. Overall, this theory offers a more complex understanding of HIV and AIDS than the dominant causal theory by acknowledging the roles co-factors play in HIV and AIDS acquisition, and progression from HIV to AIDS. Furthermore, this theory argues against an alarmist and fatalistic picture of HIV and AIDS. It provides optimistic ways to rethink the relationship between HIV and AIDS, tangible ways to treat HIV seropositive people who lack access to expensive anti-retroviral treatments,

and strategies to combat HIV and AIDS (Matthews 1997, Root- Bernstein 1990,1992, 1993, 1995, 1997, 2002).

Splitting the HIV/AIDS Myth

One of the most important aspects the co-factor theory highlights is the common assumption that HIV=AIDS. The co-factor theory illuminates the distinction between the human immunodeficiency virus (HIV) and the acquired immune deficiency syndrome (AIDS). HIV and AIDS are not equivalent. HIV is a virus. AIDS is a syndrome. According to dominant ideology, HIV is the virus believed to cause AIDS. However, a syndrome by definition is not caused by a single infectious agent, like a disease, but by several infectious agents. Therefore, statements referring to HIV as the "AIDS virus" and AIDS as a "disease" are misleading. Furthermore, using HIV and AIDS interchangeably is erroneous. (Root-Bernstein 1993).

To exemplify this point further, there are known cases of people who contract HIV yet do not acquire AIDS. Similarly, there are cases of people who develop AIDS without ever testing positive for HIV. It is important to note that a correlation should not be mistaken as causality. In other words, a correlation between HIV and AIDS does not imply that HIV causes AIDS, or that HIV and AIDS are equivalent (Root-Bernstein 1993).

HIV According to the Co-factor Theory

The co-factor theory maintains that the human immunodeficiency virus (HIV) exists and is indeed, strongly correlated or associated with AIDS. However, this theory disputes the hypothesis that HIV is the sole causative

agent of AIDS. Again, the co-factor theory reifies the distinction between 'disease' and 'syndrome' and illuminates the fact that AIDS is not "a distinct disease entity" (Root-Bernstein 1990:480). Therefore it is misleading to assume that the acquired immune deficiency syndrome (AIDS) is caused by one etiologic agent. Furthermore, this theory highlights the fact HIV infected people do not die from the human immunodeficiency virus (HIV), but from an array of known diseases and opportunistic infections known to lead to immunosuppression (Root-Bernstein 1990:480). Thus the co-factor theory argues, the human immunodeficiency virus (HIV) cannot be the sole cause of AIDS (Root-Bernstein 1990, 1992, 1993, 1994, 1997, 2002).

Another significant dissension between the dominant HIV causes AIDS theory and the co-factor theory is that the latter claims, "susceptibility to infection is as important to disease acquisition as is the causative agent" (Root-Bernstein 1992:256). In other words, HIV can only successfully invade healthy cells if individuals are susceptible to contracting the infection. Susceptibility to infection is based on the functioning of the immune system. If the immune system is compromised, susceptibility to infection is high (Root-Bernstein 1990, 1992, 1993, 1997, 2002, See also: Fenton and Silverman 2000, Howard and Millard 1997, Kean *et al* 1999c, g, Kim *et al* 2001, Leonard-Green and Watson 1989, Romeyn 1998).

Compromised immunity occurs when the immune system is fighting infectious agents, such as co-factors. Furthermore, the HIV virus can only replicate if T-cells of the immune system are activated. Co-factors are known to activate T-cells and therefore, assist in HIV replication. Thus, this theory argues that co-factors are essential to HIV infection and replication.

Furthermore, 'healthy functioning immune systems can successfully combat HIV infection and replication' (Root-Bernstein quoted in Matthews 1997:12).

The co-factor theory asserts that the strong association between HIV and AIDS may be based on a synergistic relationship between a virus and bacterium. This idea is similar to how a deadly form of pneumonia forms and functions. Pneumonia for example, is a combination of two distinct etiologies; the influenza virus and the bacterial agent *Staphylococcus aureus*. Individually, each disease agent follows a distinct pathology, and produces specific symptoms. When combined, the viral and bacterial agents work synergistically, resulting in a distinct, and lethal health condition. (Root-Bernstein 1995:123). Individually neither the influenza virus nor *Staphyloccocus aureus* are *sufficient* to cause pneumonia. However, both are *necessary* for causing pneumonia (Root-Bernstein 1995:125). Applying this concept to the context of HIV and AIDS, HIV alone cannot lead to AIDS. However, if HIV is combined with a co-factor such as a STD, the two agents combine synergistically and can potentially lead to AIDS (Root Bernstein 1995).

AIDS According to the Co-factor Theory

According to the co-factor theory, the acquired immune deficiency syndrome is not a "disease" caused by the human immunodeficiency virus (HIV). It is an immune disorder syndrome characterized by a myriad of previously known diseases and health conditions that lead to immunosuppression. It is important to realize that the immune system has to be compromised; suppressed or depressed, before contracting any health condition. Thus, individuals are susceptible to infectious pathogens when

immunocompromised. In other words, immunosuppression lays the groundwork for successful antigen invasion of co-factors and other pathogens that lead to immunosuppression (Root-Bernstein 1993).

AIDS is an immune disorder syndrome. AIDS according to the co-factor theory, is similar to the fifth and final stage of HIV according to the dominant theory, known as the late symptomatic infection. It is only at this stage, the dominant theory claims, that HIV has progressed to the point of becoming AIDS. At this point both theories maintain that T-helpers cell numbers are lower than 200, and the immune system is unable to function properly and combat infectious pathogens. At this stage, it is common for AIDS patients to experience multiple concurrent infections. This stage is commonly referred to as Stage IV or full-blown AIDS, and characterizes the 'wasting' aspect of the syndrome.

It is important to note that Root-Bernstein's co-factor model of HIV and AIDS is "completely consistent with current data concerning AIDS" (Root-Bernstein 1995:115). Furthermore, "co-factor control of AIDS is neither antithetical to nor inconsistent with HIV targeted preventative measures and therapies" (Root-Bernstein 2002:1). He asserts that both the co-factor control of AIDS, and HIV focused preventative strategies are important, and "can be used as adjuncts to each other" (Root-Bernstein 2002:1).

Underlying HIV and AIDS in sub-Saharan Africa

As mentioned, compromised immunity paves the way to antigen invasion. Immunosuppression increases the susceptibility to contracting other immunosuppressive illnesses, such as co-factors. Furthermore,

immunosuppression influences the susceptibility to contracting HIV and when combined with co-factors, can lead to the progression and development of AIDS. The co-factor theory highlights that one of the oldest known and underlying causes of immunosuppression is malnutrition (Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002, Matthews 1997). This has significant implications in the the context of Tanzania, sub-Saharan Africa, and other areas of the world highly affected by HIV, AIDS, "poverty", and malnutrition.

The next chapter explicates the interrelationship of HIV, AIDS, and malnutrition in the context of Tanzania, and highlights the role malnutrition plays in HIV and AIDS pathogenesis.

Chapter 3: Malnutrition

What is Malnutrition?

Malnutrition is an imbalance in nutrient intake. Malnutrition is measured and defined in terms of excess or deficiency, of macronutrients and micronutrients. Macronutrients provide the only source of energy for the body, and constitute the "basic building blocks of cellular growth" (Gardner and Halweil 2000:10). Examples of macronutrients are: carbohydrates, protein, and fat. Each gram of fat provides approximately nine calories; and each gram of protein and carbohydrate provides the body with approximately four calories. (Gardner and Halweil 2000, Piwoz and Preble 2000).

Vitamins and minerals are micronutrients. Unlike macronutrients, micronutrients do not provide energy for the body. However, micronutrients are essential to the body, and work in tandem with macronutrients, to "build and maintain the body" (Gardner and Halweil 2000:10). Micronutrients are consumed in small amounts, and examples include: calcium, iron, and vitamins A through E. (Gardner and Halweil 2000, Piwoz and Preble 2000).

Root Causes of Malnutrition

The three main forms of malnutrition include: overnourishment, hunger, and vitamin and mineral deficiency (Gardner and Halweil 2000:10). Overnourishment results from an excess intake of macronutrients. Hunger results from a deficient intake of macronutrients. Vitamin and mineral deficiency results from inadequate micronutrient intake. It is important to note that vitamin and mineral deficiency is a form of malnutrition, and is a a cause

and consequence of overnourishment and undernourishment. Thus, vitamin and mineral deficiency is a form of malnourishment that can affect overweight and underweight people (Gardner and Halweil 2000, Piwoz & Preble 2000).

In general, the underlying cause of excess macronutrient intake is a sedentary lifestyle, and overconsumption of unhealthy foods. The underlying cause of a deficient intake of macronutrient intake is "poverty" (Gardner and Halweil 2000). The underlying cause of vitamin and mineral deficiency is a result of a micronutrient-poor diet. (Gardner and Halweil 2000).

Global Malnutrition

Malnutrition is an escalating problem worldwide, in terms of excess (overeating), and deficiency (hunger) of macronutrient intake. The overall explanation for the increase in global malnutrition is rooted in transforming patterns of eating, and unequal distribution of food. In general, more nutritious foods have been replaced by less nutritious foods in many parts of the world. Furthermore, some nations are overfed, where as other nations are underfed, and experience periodic or chronic food shortages. (Gardner and Halweil 2000).

For example, in the United States over 55% of the population is considered to be overweight, followed by 54% in the Russian Federation, 51% in the United Kingdom, 50% in Germany, 41% in Colombia, and 36% in Brazil (Gardner & Halweil 2000:11). In Bangladesh, 56% of the population is considered to be underweight, followed by 53% in India, 48% in Ethiopia, 40% in Viet Nam, 39% in Nigeria, and 34% in Indonesia (Gardner & Halweil 2000:11). Despite the fact that overeating is a form of malnutrition that

spreads across the globe, hunger in general, disproportionately affects the underdeveloped and poverty-stricken nations and regions of the world. (See: Gardner and Halweil 2000, PCHPA 2002, Raikes 1988).

Hunger was identified as a global concern circa 1970. Out of this concern grew intervention, prevention, and development strategies focused on eradicating global hunger. Three decades later, the rate of global hunger decreased by approximately 14% (Gardner and Halweil 2000: 11). For example, "the greatest absolute progress" to reduce hunger was accomplished in Asia, where the rate of underweight children decreased from 44% in 1980, to approximately 29% in 2000. The "greatest relative reduction" was achieved in Latin America, where the population of underweight children decreased by 50% (Gardner and Halweil 2000:12). In most developing countries, the percentage of underweight children, between 1980 and 2000, decreased from 37% to 27% (Gardner and Halweil 2000: 12-13).

However, on the African continent, the percentage of underweight children increased, from 26% in 1980, to 29% in 2000. Furthermore, in sub-Saharan Africa, the percentage of underweight children escalated to approximately 36% in 2000 (Gardner and Halweil 2000:). This rate has continued, and continues to increase (PCHPA 2002). In many rural and urban areas in sub-Saharan Africa, the percentage of underweight children exceeds 36%, and reaches 50% (Gardner and Halweil 2000, PCHPA 2002).

Malnutrition in Industrialized Countries

In general, people living in industrialized countries tend to have more sedentary lives and (over)consume foods that are quickly and easily prepared,

compared to people living in "developing" countries. Furthermore, agricultural products and food in industrialized countries are often produced through nutrient leaching agricultural practices, and processing methods. (Gardner and Halweil 2000).

To elaborate further, industrialized nations rely heavily on agricultural inputs (fertilizers, pesticides, insecticides) to generate mass food production. Over time, these inputs degrade the quality and micronutrient content of the soil, which results in the production of less-nutritious foods. Also, industrialized nations tend to rely heavily on food processes (refining, milling) which strip foods of macronutrient, and especially micronutrient content. For example, whole foods have been increasingly replaced with refined foods, which are stripped of essential vitamins and minerals (micronutrients). Although foods are often enriched and fortified with vitamins and minerals in industrialized countries, overconsumption can also lead to an excess of micronutrient intake. Furthermore, diets in industrialized countries tend to be higher in fats and sugars (macronutrients) than in the past, and compared to less-industrialized nations. Thus, a sedentary lifestyle combined with overeating, and an overall imbalance in nutrient intake has led to an increase in malnutrition in industrialized nations. (Gardner and Halweil 2000).

It is important to keep in mind that inequality and "poverty" in industrialized nations, such as the United States, have been growing since 1980, and continue to grow (Aguiree and Turner 2001, Rothenberg 2001). As a result hunger has increased, and continues to increase and disproportionately affect the "poor". Elaborating further on this idea in the context of industrialized nations, stretches beyond the scope of this paper, in

the sense that the focus on malnutrition is in the context of Tanzania, in sub-Saharan Africa. However, this idea highlights the fact that inequality exists in all continents, countries, regions, cities, towns, villages, and structured institutions.

Malnutrition in Developing Countries

As mentioned previously, "poverty" is viewed as the root cause of hunger in developing nations (Gardner and Halweil 2000). I argue that "poverty" is a constituting cause and effect of inequality that disproportionately affects "developing" countries in the world affected by high and escalating rates of malnutrition caused by hunger.

It is important to realize that the relationship of inequality, "poverty", and hunger are inextricably intertwined. For example on a global scale, most industrialized countries have the ability to produce and procure adequate supplies of food to feed the population. This ability is rooted in a strong industrial and technological infrastructure, and agricultural base. However, most "developing" countries lack the technological and industrial infrastructure to produce enough food to feed the population, and the means to transport and distribute food. In general, "developing" nations lack the ability to adequately produce, supply, and distribute food. This results in food insecurity in "developing" countries. Thus, in general industrial and developing nations face different issues in supplying and accessing food, and these opposed problems result in different forms of malnutrition; overfed in industrial nations, and hunger in "developing" nations. (See: Aziz 2001, FAO 2002b, Gardner and Halweil 2000, George 1988, Haddad 2001, de Haen 2001, Karanja 2001,

PCHPA 2002, Peterson 2000, de Sand 2001, Sen 1981, Valente 2001, Warnock 1987, Wilcock 2001, Windfuhr 2001, Woube 1987).

The growth of the extreme forms of malnutrition; overnourishment (overeating) and hunger (undernourishment), in the past three decades, is a result of growing disparity in the world. The growing disparity results in the unequal access and ability, to procure adequate supplies of nutritious food. This disparity and inequality is caused and exacerbated by a myriad of overlapping factors, which emanate from "human decisions" such as: war, famine, drought, and disease; the global political economy of food; agricultural and trade policies; structural adjustment programs (SAPs); food policies; 'poverty eradication policies' that ignore hunger and malnutrition as constituting causes and effects of "poverty"; and the dismissal of food security as a human right (Gardner and Halweil 2000:17, See also: Aziz 2001, de Haen 2002, Hopkins and Puchala 1978, Iliffe 1979, Karanja 2001, Msambichaka *et al* 1994, Nantel 2001, Ngongi 2001, PCHPA 2002, Raikes 1988, van de Sand 2001, Swaminathan 2001, Valente 2001, Warnock 1987, Wilcock 2001, Windfuhr 2001).

Agriculture is the backbone of any society. Solid technological, physical, and industrial infrastructures are components which create and sustain the agricultural base of a nation. An agricultural base sustains the livelihood of a nation, even when crises occur. However, in nations where the ability to mass produce, supply, and distribute food is weak, crises dramatically affect the food security of a nation. Drought, famine, internal and external political instability, and global trade laws for example, greatly influence who possesses the ability and social capital to secure food. Thus the technological, physical, and

industrial components of a nation's infrastructure influence the capability of a nation to adequately feed and sustain a population, especially during times of crises. (Barkan 1994, Davis 2001, FAO 2002b, d, Future Harvest 2001, Gardner and Halweil 2000, George 1988, de Haen 2001, Hopkins and Puchala 1978, Kean *et al* 1999b, d, Msambichaka *et al* 1994, Mwakisyala 2002, Neondo 2003, PCHPA 2002, Rosset 2002, Shillington 1995, Sen 1981, Swaminathan 2001, UN 2002, Wafula 2001, Warnock 1987, Wignaranja 1990, Woube 1987).

Infrastructures in "poor" countries are "underdeveloped" or "developing" in terms of industrialization, technologization, construction of roads and transportation networks, and in the ability to adequately feed the population. In many "developing" countries, the ability to mass produce food is much lower that in industrialized countries because of a lack of industrialization, technology, and physical infrastructure. In most cases, people in "developing" countries are small-scale farmers who maintain their families through the production and sale of agricultural products. (See: FAO 2001f, g, FAO 2002a, c, d, Future Harvest 2001, Gardner and Halweil 2000, George 1988).

Thus "developing" nations in many ways, are more prone to food insecurity, compared to industrialized nations, given the differences in infrastructural and agricultural foundations, and ability to mass produce, supply, and feed the population, and sustain crises. Human crises greatly compound the ability of developing nations to adequately produce, supply, and feed the population. "Developing" nations are most prone to "poverty" because of the challenge to adequately feed the population, and sustain food supplies, especially during times of crises. "Developing" countries are the countries in the world deemed to be the most poor and "poverty" stricken, because of this

challenge. Furthermore, "developing" countries in the world are vulnerable to "poverty", and highly susceptible to "poverty" related hunger and malnutrition.

Hunger and Malnutrition in Africa

At the World Food Summit in 1996, major donors including the United States pledged to reduce global hunger by 50%, by the year 2015. The United States devised the Action Plan on Food Security, and promised to grant more support to eradicate hunger in Africa. The United States also implemented several initiatives such as: the Africa Food Security Initiative, the Seeds of Hope Act, and the African Growth and Opportunity Act (AGOA). (PCHPA 2002:11, See also: FAO 2002b, d, FAO and WHO 1992).

However despite the pledge made at the World Food Summit, and the development and implementation of initiatives to reduce hunger in Africa, between 1996 and 1999 aid to Africa decreased by 18 percent (PCHPA 2002:11). Over the past twelve years, U.S. bilateral assistance for agriculture decreased by approximately 66%. This was compounded by a 50% plummet in aid for agriculture to Africa from other countries; and 75% plummet in aid from the World Bank (WB) (PCHPA 2002:11). Decreased aid for agriculture in Africa has had extreme and deleterious effects on the overall nutrition of the continent. Africa is the only continent in the world, where hunger and malnutrition are expected to increase in the coming twenty years (PCHPA 2002:1). Furthermore, of the 24 countries in the world that have malnutrition rates higher than 35%, 19 are in sub-Saharan Africa (PCHPA 2002:11).

Malnutrition, Immune Function, and Infection

There is a synergistic relationship among nutrition, immune function, and infection. This interrelationship is referred to as the "vicious cycle of immune dysfunction, infectious disease, and malnutrition" (Piwoz and Preble 2000:8, See also: Leonard-Green and Watson 1989). Malnutrition decreases the capability of the immune system to fight infections. A decreased ability of the immune system to fight infections can lead to the acquisition of various forms of health conditions, which can further lead to nutritional deficiencies. Nutritional deficiencies increase vulnerability and susceptibility to infections, and can lead to various forms of malnutrition. And the infectious cycle repeats. (Piwoz and Preble 2000).

The inextricable interconnection among infection, nutritional status, and immune function has been researched, documented, and widely known long before the AIDS epidemic emerged (Piwoz and Preble 2000:9). In fact it has been known for years that "infectious diseases, no matter how mild, influence nutritional status, and conversely, almost any nutrient deficiency, if sufficiently severe, will impair resistance to infection" (Piwoz and Preble 2000:8).

Malnutrition affects the function of the immune system, similarly to how the human immunodeficiency virus (HIV), and acquired immune deficiency syndrome (AIDS) affect the immune system. In fact NAIDS, or Nutritionally Acquired Immune Deficiency Syndrome, is the term that has been used for many years to refer to the impairment of the immune system caused by malnutrition (Piwoz and Preble 2000:8). Malnutrition, like HIV and AIDS, directly affects the proper function of the immune system by impairing the ability to resist, and fight infection (Piwoz and Preble 2000:25, See also: Leonard-Green

and Watson 1989).

Infection and Malnutrition

It is important to remember that nutritional balance and well-being share a direct relationship with the proper functioning of the immune system. Thus a balanced intake of macronutrients and micronutrients leads to overall balanced nutrition. Balanced nutrition maintains and promotes the proper functioning of the immune system. When the immune system functions properly, it can sufficiently prevent and fight infections. With this said, it is important to keep in mind that a compromised immune system is a precondition for pathogen invasion, and triggering of the immune system (Kean *et al* 1999 a, c, g, Piwoz and Preble 2000, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002).

HIV and the Immune System

Viruses, such as the human immunodeficiency virus (HIV), successfully invade the body by replicating inside host cells. When invaded by pathogens, such as HIV, the immune system is triggered. In order to successfully eradicate infection, the immune system must recognize and destroy infected cells. Lymphocytes are the cells that mediate immunity. More specifically, CD+4 T helper cells (also commonly referred as T-helper cells or T4 cells) are the most important lymphocytes crucial to the proper functioning of the immune system. (Piwoz and Preble 2000).

As mentioned previously in Chapter 2, HIV is believed to work by progressively impairing the immune system. The specific feature which makes HIV so harmful is that when the human immunodeficiency virus invades the

body, it specifically targets CD+4 T cells; the cells most important to fighting pathogens and mediating immunity. Through time, HIV destroys CD+4 T cells and progressively impairs the overall function of the immune system, and ability to prevent pathogen invasion. (Piwoz and Preble 2000).

HIV Infection, Nutrition, and Immune Function

During infection, including HIV infection, the overall nutritional status of the body is affected in three ways: reduction of dietary intake; reduction of nutrient absorption; and increase in utilization and excretion of macronutrients (namely protein), and micronutrients. As mentioned previously, when the body is invaded by a pathogen, the immune system is triggered. The immune system responds to the invasion by preparing, and mounting an attack to fight infection. Through these processes, and especially when the immune system is actively fighting the pathogen, the overall nutritional well-being and balance of the body is offset and unbalanced. (Piwoz and Preble 2000 See also: Leonard-Green and Watson 1989).

To elaborate further, when infected by a pathogen, such as HIV, there is a general decrease in macronutrient and micronutrient intake. This can be related to for example, a decreased appetite. Second, there is an increased inability to absorb macronutrients and micronutrients, which can be a result of vomiting and diarrhea. Third, there is an excessive use, and loss of, macronutrient and micronutrients. This can be related to the aforementioned factors, symptoms associated with infection, as well as the extra energy and nutrients needed and used by the body to effectively eradicate infectious pathogens. (Piwoz and Preble 2000:8 See also: Leonard-Green and Watson

1989).

As stated earlier, micronutrients are vital to the overall function of the immune system. Deficiencies of micro-nutrients can lead to malnutrition, compromised immunity, and infection. More specifically, during infection there is an increase in utilization of micronutrients, known as anti-oxidants. Examples of anti-oxidant micronutrients include: vitamins A, C, E, and minerals: iron, zinc, selenium, and manganese. (Piwoz and Preble 2000 See also: Leonard-Green and Watson 1989, Romeyn 1998).

During infection, anti-oxidant micronutrients are crucial to maintaining a balanced oxidative state, or cell homeostasis. When the body is infected by a pathogen, there is an increased release of pro-oxidant cytokines. Anti-oxidants and pro-oxidants work in tandem to maintain a homeostatic oxidized state. An increase in pro-oxidant cytokines requires an increase in the utilization of antioxidant vitamins and minerals to maintain homeostasis. Thus, anti-oxidant micronutrients are crucial for maintaining a balance between pro-oxidants and anti-oxidants, and preventing oxidative stress, or an imbalance between pro-oxidants and anti-oxidants. (Piwoz and Preble 2000, Romeyn 1998, See also: Leonard-Green and Watson 1989).

Furthermore, anti-oxidants work by eliminating free radicals from cells. Though free radicals are sometimes helpful in fighting invasive cell pathogens, they can also destroy nearby healthy cells and tissues during infection (Romeyn 1998:43). Anti-oxidants work by neutralizing the destructive tendency of free radicals, and damage to healthy cells, which are needed to prevent and fight infection and viral replication. Though anti-oxidants occur naturally in the body and cells, during infection, there is not an adequate level to neutralize free

radicals. This is because during infection, the level of anti-oxidants is already compromised, through a decrease of micronutrient intake, excess use, and excretion. (Piwoz and Preble 2000, Romeyn 1998, See also: Leonard-Green and Watson 1989).

In addition, free radicals serve as hosts for HIV replication. Studies show 1) If anti-oxidants are added to a culture dish in which HIV is growing, the HIV replication decreases. 2) Conversely, if anti-oxidants are removed, HIV activity and replication increases 3) The level of anti-oxidants in the blood of HIV infected individuals is decreased, and progressively decreases as illness accelerates. 4) The progression of HIV is sustained by anti-oxidant supplementation (Romeyn 1998:43-44).

Thus, anti-oxidant micronutrients are crucial in preventing oxidative stress, and replication of viruses, such as HIV, in host cells. Without an adequate supply of anti-oxidants cells, proteins, and enzymes are damaged, and HIV virus replication occurs more easily, and quickly (Piwoz and Preble 2000: 8-9, Romeyn 1998:43-44, See also: Leonard-Green and Watson 1989).

Infection, including HIV infection, also affects the function of hormone production. More specifically, infection affects the production of hormones necessary for the metabolism of macronutrients: fats, proteins, and carbohydrates. These hormones include: insulin, glucagen, epinephrine, and cortisol. Increased levels of the aforementioned hormones are related to, and contribute to, weight loss and wasting which are commonly associated and observed in adults living with HIV, and AIDS (Piwoz and Preble 2000:9, Romeyn 1998). As for "infants and young children in developing countries, who are frequently malnourished and susceptible to many infectious diseases", it is

difficult to determine, without serologic HIV tests, between HIV and AIDS related malnutrition, and malnutrition related to other causes (Piwoz and Preble 2000:9).

Wasting Syndrome

The wasting syndrome is an important aspect of the acquired immune deficiency syndrome (AIDS). Wasting is a "severe nutritional manifestation of AIDS" (Piwoz and Preble 2000:10). It is characterized by dramatic reduction in weight, and occurs specifically in adult AIDS patients. The wasting syndrome is commonly preceded by: changes in body composition which are more difficult to detect than weight changes, such as body cell mass and lean body mass; weight fluctuations; rapid weight loss; and repeated infections (Piwoz and Preble 2000:10-11). Typically, wasting and weight loss occur as a result of three intertwining factors: nutrient malabsorption; reductions in food intake, and metabolic alterations. (Piwoz and Preble 2000:10-11, See also: Leonard-Green and Watson 1989).

Reduction in food intake is acknowledged as the most crucial cause of slow and progressive loss of weight experienced by people living with HIV, and AIDS. It may result from sores in the mouth, pharynx ,and esophagus; changes in mental state, fatigue, depression, and other "psychosocial factors" that affect appetite (Piwoz and Preble 2000:11). Also, economic factors affect the accessibility, availability, quantity, and nutritional quality of food. Medications also cause side effects that directly affect food intake such as: anorexia, nausea, vomiting, diarrhea, and abdominal cramps (Piwoz and Preble 2000).

Nutrient malabsorption is a common result of diarrhea, and common

infections and co-factors which are related to, and can accompany, HIV and AIDS such as malaria, giardia, worms, parasitic infections, and typhoid. Diarrhea can also occur as a result of medications used to treat the aforementioned health conditions. In accordance with the dominant causal theory, malabsorption of carbohydrates and fats commonly occurs during all stages and phases of HIV and AIDS, in both adults and children. It is important to note that fat malabsorption affects the absorption and ability to utilize fat-soluble vitamins, such as vitamins A and E. This further compromises overall nutritional and immunologic status. (Preble and Piwoz 2000:10-11, See also: Leonard-Green and Watson 1989).

Metabolic alterations refer to the effects of HIV infection and AIDS on protein, fat and carbohydrate (macronutrient) metabolism. "Infection results in increases of energy and protein requirements, as well as inefficient utilization and loss of nutrients" (Piwoz and Preble 2000:11). When food is restricted or reduced, the production of glucagen and insulin is altered. Glucagen and insulin work to regulate the flow of sugar and nutrients in the blood, intestine, liver, and other body tissues. Through time of reduced intake, the body begins to break down body protein, in order to derive and produce glucose. This causes protein loss, muscle wasting, and weight loss (Piwoz and Preble 2000, See also: Fenton and Silverman 2000, Kim *et al* 2001, Leonard-Green and Watson 1989).

Reduction in food intake, nutrient malabsorption, and metabolic alteration are not mutually exclusive processes. In fact these processes commonly occur together, and lead to severe body wasting and weight loss in patients with HIV and AIDS. The interconnection of these processes makes it

complicated to actually treat and intervene weight loss and wasting. Weight loss and wasting associated with reduced food intake and nutrient malabsorption can be treated and reduced by treating the opportunistic infections associated with them. However, weight loss and wasting associated with metabolic changes cannot be reversed by simply increasing food intake. Programs that increase food intake have been shown to increase body fat, rather than rebuild protein stores and wasted muscle, and improve body cell mass (Preble and Piwoz 2000:12, See also: Fenton and Silverman 2000, Kim *et al* 2001, Leonard-Green and Watson 1989).

In industrialized nations, there are programs which aim to reverse muscle wasting. Participants in these programs rely on expensive appetite stimulants. Also, individuals use hormones such as testosterone and recombinant growth hormone to increase appetite and build muscle mass. Though studies show recombinant growth hormone to be successful, it costs approximately $1000 per week (Piwoz and Preble 2000:12).

There have also been trials conducted in the United States which rely on less expensive supplements, as a way to treat weight loss and wasting. These supplements contain a variety of amino acids, anti-oxidants and other vitamins and minerals. During the trial, control groups were given placebos. All HIV infected individuals who participated in the trials received nutritional counseling. Those who took the supplements and received nutritional counseling gained and maintained significantly more weight than the control groups (Piwoz and Preble 2000:12). Other studies conducted in the United States show that weight gain and maintenance is more successful among asymptomatic HIV infected individuals, who are not concomitantly affected by

secondary infections associated with HIV and AIDS. Participants who had already developed secondary infections continued to lose weight. (Piwoz and Preble 2000).

In Africa, there is a relative lack of information and documentation showing the success of nutritional therapy and counseling used to intervene and treat weight loss and wasting. However, the aforementioned studies in the United States imply that the effect of nutritional therapy and counseling depends at what stage of HIV and AIDS the participants begin treatment. It seems that asymptomatic HIV+ individuals will be more successful than those who have already developed secondary infections. This implies individuals who have already progressed to AIDS, and stage IV full-blown AIDS, will not be able to treat weight loss and wasting. This has specific implications for sub-Saharan Africa where in general, people do not know their serostatus until after developing secondary infections, and thus, have progressed to AIDS. (Piwoz and Preble 2000).

Malnourished individuals are more vulnerable and susceptible to contracting infections and viruses, including the human immunodeficiency virus (HIV). HIV seropositive individuals are challenged by compromised immunity. HIV seropositive people who are malnourished are more vulnerable to contracting concomitant secondary, or opportunistic infections, than HIV+ individuals who are nourished. Because HIV is believed to work progressively through time destroying cells vital to fighting infection and debilitating the immune system, malnutrition compounds HIV infected individuals' vulnerability and susceptibility to opportunistic infections and co-factors, and AIDS progression. Malnutrition also escalates progression to Stage IV full-blown

AIDS, characterized by dramatic weight loss, severe body wasting and imminent death (Kean *et al* 1999a, c, Piwoz and Preble 2000).

What the HIV Causes AIDS Theory Overlooks

A linear casual relationship between HIV and AIDS provides a simplistic and alarmist explanation of HIV and AIDS. This theory dismisses the role malnutrition plays as a co-factor in the pathogenesis of HIV and AIDS (FAO and WHO 1992, Kean *et al* 1999a, c, f, g, Matthews 1997, Piwoz and Preble 2001, Romeyn 1998, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002).

The co-factor theory lends a plausible theoretical explanation by considering the role malnutrition plays in increasing vulnerability to contracting the human immunodeficiency virus (HIV), and developing the acquired immunodeficiency syndrome (AIDS) (Root-Bernstein 1997, 2002). This theoretical connection specifically applies to the case of Tanzania where malnutrition and HIV and AIDS rates are increasing, and where access to treatment is impractical for most people in need (Weissman *et al* 2001).

The following section illustrates the intertwining of history, "poverty", malnutrition, illness, and HIV and AIDS, in the context of Tanzania.

Chapter 4: Tanzania

Tanzania gained independence from British colonial rule on December 9, 1961. Julius Nyerere, served as the first prime minister of Tanzania (Tanganyika), from December 1961 to January 1962. In December 1962, Tanzania became a republic, and Nyerere, the first president. In April 1964, mainland Tanzania joined with Zanzibar, to form the United Republic of Tanzania. Julius Nyerere remained in power, and presided over the United Republic of Tanzania until November 1985. (Gordon and Gordon 1996, Iliffe 1979).

Move To Self-Reliance

When Nyerere came to power, he was determined to lead Tanzania to a path of self-reliance (*kujitegemea*), independence, and development. However, Nyerere was opposed to the European model of development based on capitalist industrialization, which other African leaders and nations followed after attaining independence from colonial rule (Shillington 1995).

Specifically, Nyerere was against an ideology of development premised on foreign investment. He believed that a reliance on foreign investment increased indebtedness of Africa, and encouraged dependency on former colonial powers. Nyerere also believed this model of development perpetuated the colonial legacy of draining Africa of its resources, and supplying the developed and industrialized economies of Europe and the northwest. Ultimately, Nyerere believed the European model of development made Africa more poor and "less able to feed itself", and created, reified, and perpetuated

more poor and "less able to feed itself", and created, reified, and perpetuated class divisions (Shillington 1995: 418).

Nyerere espoused an ideology of African Socialism as the way to prevent European imperialism and dependency, and lead Tanzania to independence, self-sufficiency, and development. This form of African Socialism is known as *Ujamaa*, which in Kiswahili refers to mutual co-operation, family hood, and self-help. Nyerere's ideology of African Socialism, *Ujamaa,* eulogized a romantic view of the past, in which African societies were traditionally communal, independent, and self-sustaining. (Shillington 1995).

Nyerere's blueprint for *Ujamaa* was presented in the Arusha Declaration, in 1967. His vision of *Ujamaa* is founded on principles of rural development, communal labor, and agriculture production. Nyerere believed that in order to attain self-sufficiency nation-wide, development needed to begin in rural, communal farming villages. He proposed the reorganization and resettlement of small, rural villages into larger, centralized villages. Nyerere believed a restructuring of small villages into larger villages would allow for more effective development, and facilitation of government services such as: roads, markets, agriculture extension outreach, technology, health facilities, and water. (Shillington 1995).

In addition, Nyerere envisioned Tanzanians living communally in *ujamaa* villages, such as he believed they had in the past, before colonialists arrived in Africa. He aspired for people to live and labor together on *ujamaa* villages, as collective communal units. Nyerere believed that collective labor would lead to increased agriculture productivity, self-reliance, and sustainability. For example, Nyerere claimed that collective planting, farming,

and harvesting would lead to an increase in agricultural productivity. Increased agricultural production, he claimed, would generate agricultural surplus. The agricultural surplus could be traded and sold at central markets, in towns, and internationally. He believed the prosperity attained from the trade and sale of agriculture products would return to the villages, and benefit all individuals, through communal sharing. Furthermore, Nyerere believed that communal labor, and collective production and sharing of resources and the fruits of labor, would prevent social and economic gaps in the centralized villages, and lead to a classless Tanzanian society. (Shillington 1995).

Internal Contradictions of *Ujamaa*

Nyerere's idealistic vision of African Socialism, *Ujamaa,* was imbued with a grave contradiction; "it was self-imposed help from above" (Shillington 1995:419). Nyerere envisioned a communally structured society premised on goals of self-reliance and sustainability, but he wanted the government to control all aspects of Tanzanian society. For example, in attempt to control all revenue sources and restrict capital movement in Tanzania, Nyerere nationalized all banks and foreign owned and run businesses. In addition, he imposed the "Leadership Code", which prevented political leaders from accumulating private wealth. (Shillington 1995).

When encouragement and persuasion by the government, to resettle in centralized villages and live and labor communally, did not prove successful, Nyerere instituted "compulsory villagisation" (Shillington 1995:419). Compulsory villagisation was in essence, oppressive. Many Tanzanians did not want to leave their ancestral homelands to resettle in centralized, and

government planned and controlled villages. Also, many Tanzanians did not want to give up their individually owned farming plots, to live and work communally in *ujamaa* villages. Compulsory villagisation was at times inefficient, because people were resettled in *ujamaa* villages prior to the construction and availability of markets, health services, and roads. In addition, there was often a lack of basic commodities in the *ujamaa* villages, such as sugar, soap, and paraffin. (Shillington 1995:419).

From 1973 to 1974, Tanzania experienced a severe drought. During this period of time, many Tanzanians were affected by food insecurity, famine, hunger, disease, and death. This experience encouraged many Tanzanians, many who suffered the consequences of the drought, to resettle in *ujamaa* villages to gain the security of a communal livelihood. As a result, approximately five million Tanzanians resettled in *ujamaa* villages, from 1973 to 1976. By 1977, there were approximately 8000 *ujamaa* villages in Tanzania. (Shillington 1995: 418-420).

Nyerere's idealistic vision, that rural development would lead to self-sufficiency and sustainability, was not actualized, due to a myriad of reasons. Overall, agriculture production on communal lands in *ujamaa* villages did not increase. Because there was not an overall increase in agriculture production, *ujamaa* villages did not generate agricultural surplus, which was an expected result of communal agriculture production. Furthermore, people living in the *ujamaa* villages did not experience the prosperity anticipated from communal living, working, and sharing of resources. (Shillington 1995).

In addition, *Ujamaa* did not lead to Nyerere's goals because many Tanzanians affected by the policies of compulsory villagisation were forced to

leave their lands, and often, resettle on less agriculturally productive land. Also, many of the agriculture extension experts responsible for providing advice and outreach to farmers in *ujamaa* villages tended not to know as much about farming as the farmers, and therefore did not "know best" (Shillington 1995:420). Often, Tanzanian "peasants" living and working in the *ujamaa* villages, were not treated with respect by the agriculture extension officers, and other government officials (Shillington 1995:419). They were often intimidated by government officials, and portrayed as "backward" and "ignorant" (Shillington 1995:419-420). Furthermore, Tanzanians living in *ujamaa* villages were blamed for "not accepting and understanding the advantages of villagisation", and for the failures of *Ujamaa* (Shillington 1995:420).

By the early 1980s, Nyerere and the government realized that institutionalized policies were not successful in achieving the goals of *Ujamaa*. The failures of *Ujamaa* experienced during the 1970s were acknowledged by Nyerere and the government, and the Tanzanian farmers were granted more respect for their farming knowledge, skills, and experience. The strict *Ujamaa* villagisation policies were eased, and Tanzanian farmers were allowed to practice non-communal agriculture farming. Some Tanzanian farmers took advantage of this opportunity and became successful "petty-capitalists", and producers of cash crops such as coffee, cotton, tea, and sisal (Shillington 1995:420).

Compared to Kenya, which adopted the European model of development after achieving independence from British colonial rule, Tanzania did succeed in preventing a massive accumulation of landless citizens (Shillington 1995:420, See also: Apter and Rosberg 1994, Barkan 1994).

However, Nyerere's vision of African socialism, *Ujamaa,* failed in Tanzania. His goal of achieving national self-sufficiency and sustainability through rural development was not achieved, predominantly because of the implementation of top-down approaches. Many Tanzanians resented the compulsory villagisation policies, which forced them to leave their ancestral land and individually operated farms. In addition, life in the *ujamaa* villages failed to meet Nyerere's expectations, since agricultural production and surplus did not increase, and the villages proved not to prosper, and attain self-sufficiency. (Shillington 1995:417-420, See also: Apter and Rosberg 1994, Barkan 1994, Hopkins and Puchala 1978, Raikes 1988).

Starting in the late 1970s, International Financial Institutions (IFIs) offered assistance to Tanzania, in an attempt to reverse the declining economy and stimulate the development of Tanzania. However, acceptance of international assistance from the IFIs was contingent on macroeconomic restructuring of the economy. For example, the IFIs demanded Tanzania to reinvigorate the exportation of agriculture commodities by devaluing the Tanzanian shilling, and deregulating the market. In order to decrease the enormous debt and budget deficits, the IFIs required Tanzania to cut social welfare spending and funding, through liquidating and privatizing "money-losing state-owned corporations" (Barkan 1994:29).

Although Nyerere realized that the economy of Tanzania had been experiencing decline, he remained steadfast to his vision and decision to refrain from assistance, and dependency on, international donors. He was cognizant that economic and political reform were interlinked, and believed that accepting assistance, and committing to agreements put forth by international

donors would ultimately, threaten the sovereignty of Tanzania. Nyerere believed that accepting economic and development assistance from international donors would restructure the ruling socialist party, Chama Cha Mapinduzi, (CCM). Allowing international donors to interfere and influence the governance of Tanzania, would relegate CCM subordinate to the power of the IFIs, and subvert the political goals of achieving socialism, self-reliance, and independence. (Barkan 1994).

Furthermore, Nyerere believed a macroeconomic restructuring would affect microeconomic changes, and alter and divide Tanzanian society. To elaborate further, Nyerere was adamantly opposed to devaluing Tanzanian currency, and liquidating and privatizing government owned and operated corporations. These preconditions set forth by the IFIs, specifically countered Nyerere's socialist ideas of restricting capital flow, nationalizing, instituting parastatals, and banning the accumulation of private profit, and individual wealth. Nyerere believed that if the government accepted these conditionalities, Tanzanian society would become stratified hierarchically like a capitalist society, not as the socialist classless society he envisioned. (Barkan 1994).

Decline and Poverty

During the late 1970s and early 1980s, Tanzania remained one of the poorest African countries (Shillington 1995:420). This was a cause and consequence of the dependency of the Tanzanian economy on the exportation of raw materials such as: sisal, cotton, tea, and coffee. To elaborate further, relying on the international market to maintain the economy was very unstable,

since the prices of raw materials were externally controlled. Furthermore, the raw materials were exchanged for "increasingly expensive manufactured imports" (Shillington 1995:420). Tanzania owed enormous foreign debts, and was experiencing an economic downspiral during this period. Furthermore, the agriculture and industrial sector were not able to meet the needs, and feed, a growing Tanzanian population. (Shillington 1995).

By the 1980s, Tanzania was experiencing a major debt crisis. Hard currency was scarce, which made it impossible for Tanzanians "to procure imported industrial inputs" used to develop and maintain the agriculture and industrial sectors of society (Barkan 1994:164). Furthermore a shortage of hard currency made it impossible for Tanzania to construct and maintain the physical infrastructure, such as roads and railroads. This resulted in an "acute deterioration" of Tanzania's roads and railroad networks, and furthermore created tremendous problems for transporting food and export crops (Barkan 1994).

The economic downspiral tragically affected the lives of Tanzanian citizens. For example, by the 1980s, Tanzanians "had become materially poorer " since the country attained independence (Barkan 1994:164). Consequently, middle class citizens, such as industrial managers, university lecturers, and civil servants were challenged in their ability to sustain a livelihood, and procure daily necessities. Many, Tanzanians working for the formal sector were forced to supplement their incomes by doing work in the informal sector. Consequently, an increase in informal sector greatly decreased the tax base of the Tanzanian government, and led to a decrease in provisioning of social services, such as education and health care facilities.

(Barkan 1994).

In attempt to maintain health and educational services, the government of Tanzania "resorted to deficit budgeting" (Barkan 1994:164). Deficit budgeting was financed by inflation, or an enormous increase in money supply. Inflation reached to approximately 30% per year in the early 1980s, and further led to an increased national budget deficit, and indebtedness of the Tanzanian economy (Barkan 1994:164).

In addition, daily life became evermore challenging for a majority of Tanzanians and rapidly increased the the gap between those who were able to sustain, and those who could not. For example, the lives of parastatal employees and civil servants were greatly affected by inflation, as the purchasing power of their salaries greatly declined. Life became even more of a challenge for Tanzanians working in the service and industrial sectors. In other words,

> day-to day life became an excruciatingly painful matter of foraging for food in informal markets; basic necessities were often available only at unaffordably high prices (Barkan 1994:165).

As a result, joblessness became commonplace. (Barkan 1994, Shillington 1995).

Although during the worst parts of the economic downspiral, Tanzania was in general, able to avert mass starvation, the "poorer segments of Tanzanian society suffered greatly from caloric and nutritional deficits" (Barkan 1994:165). As the economic situation continued to worsen, "individuals who were already nutritionally weakened, became especially vulnerable to outbreaks of diseases" (Barkan 1994:165).

IMF, WB, SAPs

After twenty-four years as leader of the Tanzanian government, Julius Nyerere retired. He was succeeded by Ali Hassan Mwinyi, who served as president from November 1985 to November 1995. Unlike Nyerere, Mwinyi was inclined to accept and follow, a model of development that encouraged dependency on foreign investment, and international donors. Soon after inheriting the frail Tanzanian economy from Nyerere in 1985, Mwinyi began to accept the conditions set, and demanded by, international donors in order to access funds for development from the World Bank (WB) and International Monetary Fund (IMF). In 1986, Mwinyi negotiated an agreement with IFIs, known as the Economic Recovery Program (ERP). Acceptance of the ERP by Mwinyi and the government of Tanzania, was contingent on restructuring the Tanzania economy, through the adoption and implementation of Structural Adjustment Programmes (SAPs). (Barkan 1994).

Under the auspices of the IFIs, and preconditions set by the ERP and SAPs, the government of Tanzania was obligated to implement three macroeconomic changes in order to obtain development assistance: balance the budget; devalue currency; and liberalize capital control. In theory, the goal of balancing the national budget of Tanzania aimed to decrease national debt. However in practice, balancing the national budget led to a mass lay offs of public employees. Consequently this led to a surge in unemployment and "poverty". In addition, a slash in the national budget led to decreased funding for social welfare, such as public housing programmes, education services, and health facilities. (See: Barkan 1994, Shillington 1995).

Devaluing currency, in theory, was supposed to ensure that producers

and exporters of raw materials, crops, and minerals, would obtain fair and reliable prices on the world market. However in practice, a devaluation in the Tanzanian shilling made imports much more expensive. The prices of consumer goods, such as fuel oil and food, surged which "meant a dramatic increase in prices on the streets" (Shillington 1995:423).

In theory, the liberalization of capital controls was meant to stimulate the economy and encourage investment in Tanzania, primarily through foreign investment. As a result, this condition exacerbated the "real structural problem" of the Tanzanian economy, which was a shortage of indigenous capital within the country (Shillington 1995:423). In addition, the industries that entered Tanzania were mostly involved in extracting natural resources, and did not aim to initiate sustainable and reliable capital flows into Tanzania (Shillington 1995).

Though economic liberalization did benefit some Tanzanians, it mostly benefited those who had the ability to take advantage of the economic liberalization policies, such as cash-crop farmers, private manufacturers, and traders. As a result, a growth in the private sector led to an expanding Tanzanian bourgeoisie, and unequal distribution of resources and wealth in Tanzanian society. (Barkan 1994, Shillington 1995).

In 1991, Mwinyi disavowed the restrictive "Leadership Code", instituted by Nyerere (Shillington 1995:418). During Nyerere's presidency, this code was successful in preventing corruption in the Tanzanian government because it barred politicians and civil servants from accumulating wealth, through private business enterprises, renting of property, and owning business shares. However, after the code was abolished by Mwinyi, government corruption

began to surge, and a focus on growth in the private sector became the engine for economic, and political development in Tanzania (Barkan 1994, Shillington 1995).

As envisioned by Nyerere, a model of development premised on ethos of capitalist industrialization and a reliance on foreign investment increased indebtedness of Tanzania to international donors, and perpetuated dependency on colonial rulers. The European model of development principled on capitalistic ethos worked for countries that were already "developed", and had a sound infrastructure. However, in Tanzania, the imposition of this model of development was not efficacious in generating development and prosperity because it worked to drain resources and capital from Tanzania, before Tanzania had constructed a sound and sustainable infrastructure and agricultural base. Overall, the acceptance of assistance from the IFIs and implementation of preconditions established by the ERP, WB, and IMF, deleteriously affected the economy, development, and infrastructure of Tanzania, and "maintained rather than reduced the country's dependency on donor assistance" (Barkan 1994:31, Shillington 1995).

President Benjamin Mkapa

In November 1995, Benjamin Mkapa succeeded Ali Hassan Mwinyi as president of Tanzania. He is currently in power. Like Mwinyi, Mkapa espouses a model of development premised on capitalist industrialization and foreign investment. His presidency is marked by his effort to to "fight poverty", "while increasing the country's openness to international trade and investment" (ILO 2003). However, a focus on international trade and investment has not made

a significant decrease in the impoverishment of Tanzania. Tanzania continues to carry the status of Least Developed Country (LDC). Last year, Tanzania was labeled a Highly Indebted Poor Country (HIPC), and as a result of HIPC status, Tanzania was "awarded substantial debt relief" (IRIN Correspondent 2003).

Presently, over 51% of Tanzanians live below the national poverty line, and approximately 20% live on less than one $USD per day (PCHPA 2002:79). However, a report conducted in 2000-01 shows that more Tanzanians now live above the poverty level than in 1991-1992. For example, the proportion of households dependent on agriculture has declined from 67 to 62 percent, and the proportion of household expenditure designated to food declined from 69 to 62 percent. The food poverty line, which refers to "the minimum spending per person needed to provide 2,200 calories a day for one month based on the foods consumed by the poorest 50% of the population", declined from 22 to 19%, in the past ten years (Neondo 2003). The basic needs poverty line, which refers to the food poverty line adjusted to incorporate basic needs, such as clothes, declined from 39 to 36 percent. However, the report states that the overall decline of: Tanzanian households dependent on agriculture; household expenditure devoted to food; food poverty line; and basic needs poverty line, are not considered "large enough to be statistically significant" (Neondo 2003).

In addition, "in 1991-92 and at present, about 41% of households have depended specifically on food crops to earn cash income" (Neondo 2003). It is important to note that expenditure on food is higher in rural areas than urban. Since 87% of Tanzanians live in rural areas, "poverty" and related issues of hunger, malnutrition, and food insecurity are overwhelmingly and disproportionately rural (Neondo 2003, See also: FAO 2001k, l, m, FAO 2002b,

FAO 2002d, FAO and WHO 1992, Foster 2002, Gardner and Halweil 2000, George 1988, Lwanga 2001, Morgan *et al* 1997, PCHPA 2002, Redfern 2002, Sen 1981, Wafula 2001).

One of the biggest reasons attributed to the very slight decrease in overall poverty in Tanzania, and the widening gap between rural and urban poverty, is the challenge Tanzania faces in feeding itself. First of all, it is important to note that Tanzania is a country that is prone to sporadic famine, or shortages of food. This is based on the fact that Tanzania is a country affected by intermittent drought, or shortages of adequate rainfall, necessary for agriculture production. Also, famine is a cause and consequence of a weak physical infrastructure, such as railroads and paved roads. The lack of a sufficient and reliable transportation system hinders the distribution and access to food in the country, specifically during periods of drought and famine.

Famine and drought are also causes and consequences of a weak agricultural sector, on which most countries base their economies. Thus countries that have weak agricultural foundations, tend to have weak economies. Countries that have strong economic bases, tend to have strong agricultural sectors, that can sufficiently sustain and feed the population. Furthermore, development and long-term sustainability, depends on agriculture. Tanzania has not yet achieved a sustainable agriculture sector which can sufficiently feed the population, specifically during periods of drought and famine. Because of this, "poverty" has not significantly decreased, and related issues of food insecurity, malnutrition, and disease are prevalent, and expected to rise, and exacerbate the disparity of rural and urban poverty (Neondo 2002, See also: Davis 2001, Gardner and Halweil 2000, Iliffe 1979,

1987, Msambichaka *et al* 1994, Raikes 1988, Sen 1981, Wafula 2001, Warnock 1987, Woube 1987).

Furthermore Tanzania has a weak industrial, physical, and technological infrastructure compared to industrialized countries, such as as the United States and members of the European Union (EU). Because of this, the productions costs of agricultural products are much higher in Tanzania, than in the US or EU. Another reason that the US and EU have lower production costs of agricultural products for example, is because the agricultural sector is subsidized by the respective governments. In Tanzania, the government has "moved away from subsidizing agriculture" which started when Mwinyi succeeded Nyerere, and has continued with Mkapa (Mwakisyala 2002). By continuing to focus on foreign investment, and the production and exportation of cash crops, Tanzania does not succeed like the US and EU, and is often forced to buy agricultural products and food from them, because they are cheaper than Tanzania produced foodstuffs and manufactured items. Basically, Tanzanian farmers cannot compete with European and American farmers (Mwakisyala 2002). A continued lack of support and focus on basing the development of Tanzania on the development of agriculture sector, from the inside to the outside, has continued to perpetuate the indebtedness and "poverty" of Tanzania. (Mwakisyala 2002).

Poverty Related Hunger and Malnutrition in Tanzania

Tanzania is a an example of a "developing" country affected by high rates of "poverty", and hunger related malnutrition. In Tanzania, as well as in other sub-Saharan African countries, malnutrition is caused by a myriad of

overlapping factors which root from food security, or the "availability, accessibility, and affordability of safe, balanced and nutritious food through production, distribution, purchase or exchange at the household level" (Kean *et al* 1999b). *Food security* also implies, "sufficient food for a normal, healthy life for each and every member of a household" (Kean *et al* 1999b). In Tanzania, household food insecurity is common and widespread, and is a cause and result of inadequate diet, and various forms of hunger related malnutrition such as: protein-energy malnutrition, iron-deficiency anemia, vitamin A deficiency, iodine deficiency, and zinc deficiency. These forms of malnutrition commonly appear in combination, and contribute to one another. (Kean *et al* 1999g, See also: Leonard-Green and Watson 1989).

Protein-energy malnutrition is considered "poverty-related malnutrition" and food insecure nations such as Tanzania, are affected most from this type of malnutrition because it is a result of low caloric and macronutrient (protein and carbohydrate) intake. It is measured in terms of body-size and micronutrient (vitamins and minerals) deficiency. This form of malnutrition is also commonly referred to as 'hidden hunger' because it is not always recognized in mild and moderate forms (Piwoz and Preble 2000:6). Common indicators in children include: stunting, or low height-for-age; underweight, or low weight-for-age; wasting/acute malnutrition, or low weight-for height. In adults, protein-energy malnutrition is measured in terms of low body mass. Among children under 5 years of age in Tanzania, approximately 42% are stunting, 6% wasting, and 27% underweight. Overall, 41% of the population in Tanzania, including children and adults, are undernourished. (PCHPA 2002:79).

Commonly reported micronutrient deficiencies in Tanzania include iron, vitamin A, and iodine. Deficiencies in these micro-nutrients, as well as other vitamins and minerals, are crucial to a properly functioning immune system, and are commonly observed in populations that experience chronic and endemic food insecurity, and infectious disease (Piwoz and Preble 2000:6, See also: Leonard-Green and Watson 1989, Romeyn 1998).

AIDS in Tanzania

The first AIDS cases in Tanzania were reported in 1983. Since then, "the epidemic has increased at an alarming pace" (USAID 2002b:1). As stated previously, HIV infection in Tanzania is believed to be predominantly spread through unprotected heterosexual contact. Sexually transmitted infections (STIs) are also believed to play an important role in facilitating the high rates of HIV and AIDS. According to a report conducted by the Joint United Nations Programme on HIV/AIDS (UNAIDS), by the end of 2001, approximately 1.3 million adult Tanzanians, or 7.8% of the population, were living with HIV/AIDS. The Ministry of Health reported a higher percentage of adult prevalence; 8 to 12%. It has been projected that due the HIV/AIDS epidemic, by 2010, life expectancy in Tanzania will decline from 65 years to 37 years (USAID 2002b:1).

According to the 1999 Tanzanian Reproductive and Child Health Survey, the percentage of Tanzanian adults who had heard about AIDS increased from 76% in 1996, to 100% in 1999. This report also asserts that approximately 80% of women knew at least one method of preventing themselves from contracting HIV. In addition, more than 56% of women and 70% of men, were cognizant that condoms help prevent sexual transmission of HIV. This report

further claims that despite the fact that "knowledge about HIV prevention has increased markedly in the last several years, condom use remained very low." It is estimated that approximately 37% of men, and 16% of women had ever used a condom, and in most cases, the purpose was for family planning. (USAID 2002b).

Between 50,000 and 60,000 Tanzanian children are born HIV positive each year. By 2015, infant mortality rate is estimated to increase by 16%, due to AIDS. By the end of 2001, there were approximately 810,000 children orphaned by AIDS in Tanzania. Though young adults between the ages of 15 to 24 years of age account for only 20% of the population, this age group accounts for approximately 60% of new HIV infection rates.

National Strategy to Combat AIDS

The Strategic Framework for the Third Medium Term Plan for Prevention and Control of HIV/AIDS/STDs for 1998-2002 in Tanzania, was formulated in collaboration with: donors (WB and USAID), nongovernmental organizations (NGOs); private sector organizations and partners, and Government Ministries. This Framework focuses on reducing unsafe sexual behavior and HIV transmission among: 1) mobile social populations; 2) sex workers; 3) the military; 4) men with several sexual partners; 5) and youth. The Strategy also emphasizes improving education services for girls; reducing sociobiological vulnerability of women; reducing youth's vulnerability to STIs, and HIV, and AIDS; providing STI treatment services; promoting safe blood transfusion services; and "reducing poverty leading to sexual survival strategies" (See: USAID 2002b:1-2).

In December 2000, the government formed the Tanzania Commission on AIDS. This organization and "mission" is supervised through the office of the Prime Minister. The Tanzania Commission on AIDS "guides national policy, acts as a clearinghouse for AIDS activities, and helps mobilize additional funds to fight the epidemic on a national level"(USAID 2002b: 2). In 2001, "a national behavior change communication campaign" was implemented, which targeted the youth (USAID 2002b: 2). Various NGOs, AIDS organizations, and private sector collaborators "carry out the initiative" established by the Tanzania Commission on AIDS (USAID 2002b: 2).

USAID Partnership

The United States Agency for International Development (USAID) is the "lead donor" in the Development Assistance Committee donor forum on HIV/AIDS in Tanzania (USAID 2002b:2). USAID played a crucial role in developing and establishing the Tanzania Commission on AIDS. The USAID/Tanzania partnership collaborates with private and public sectors to coordinate and implement HIV/AIDS activities and strategies. More specifically, "the mission" supports the development of a network of organizations, (including establishing grass-roots indigenous NGOs) to address HIV/AIDS in Tanzania, by focusing on the "dissemination of HIV/AIDS behavior change communication information through various media outlets, social marketing of male and female condoms" (USAID 2002b:2). To a lesser extent, the USAID/Tanzania mission promotes the development, and collaboration of, HIV/AIDS programs and health care programs; STIs diagnosis and treatment; peer education; and support and care for people living with HIV/AIDS (USAID

2002b:2-3).

Obstacles

According to the 1998-2002 Strategic Framework for the Third Medium Term Plan for Prevention and Control of HIV/AIDS/ STDs, there are several obstacles Tanzania faces, in responding to the HIV and AIDS epidemic. First of all, there is a scarcity of human resources trained in managing STIs, and in providing care, support, and counseling for people living with HIV/AIDS. Second, there is not an adequate supply of training materials and education materials such as books, pamphlets, and manuals on STIs and HIV/AIDS. A lack of human resources and education materials hinders the dissemination process. In addition, it is difficult to reach and educate "highly mobile populations" and sex workers on HIV/AIDS (USAID 2002b:3). Also, the supply of medicine to treat STIs and opportunistic infections is unstable and irregular. Lastly, the Framework asserts that "widespread acceptance of multiple sex partnerships" poses a major hindrance to Tanzania's national response to HIV/AIDS (USAID 2002b:3).

Weaknesses of the National Response

The national response to the epidemic in Tanzania reflects dominant thinking and ideology of HIV/AIDS, and focuses primarily on disseminating information on behavior change, through various media channels. By focusing primarily on behavior change, the Framework and national response dismiss and ignore the fact that causes and consequence of poverty include: food insecurity, malnutrition, and lack of access to health facilities, and medicines to

treat health conditions. Furthermore, these causes and consequences of "poverty" precondition vulnerability and susceptibility to HIV and AIDS. Thus, "the mission" dismisses the vicious cycle of the malnutrition-infection cycle, and the synergistic relationship of malnutrition, and vulnerability and susceptibility to any infection and health condition, including HIV and AIDS. The "mission" fails to stress and address that the synergistic relationship is further, a cause and consequence of the biomedical and socials aspects of acquiring the HIV virus, and AIDS syndrome. Furthermore, the Framework and "mission" ignores, the vicious cycle of AIDS and food insecurity, and the impact that the epidemic has on rural, farming populations and the agriculture sector (FAO 2001a, b, c, d, e, f, g, h, j, FAO 2002a, b, c, e, Gillespie and Haddad 2002, Piot *et al* Haddad 2002).

AIDS in the Rural Sector

More than 87% of Tanzanians live in rural areas, and sustain their livelihood through semi-subsistence farming. In general, Tanzanians living in the rural sectors are the most economically "poor". Research asserts that HIV and AIDS are most prevalent in the rural sectors (See: FAO 2001a, b, c, d, e, f, g, j, k, l, FAO 2002a, b, c, d). Food insecurity, malnutrition, and lack of access to education, health facilities, and medicine are also more prevalent among people who are economically poor, and live in rural areas (See: FAO 2001a, b, c, d, e, f, g, h, i, j, k, l, m, FAO 2002a, b, c, d, e, FAO and WHO 1992). In addition, according to an FAO report, Tanzania is considered to be one of the nine sub-Saharan African countries most affected by a decline in "agricultural labor force" (FAO 2001c:2). This research asserts that by 2001, the agricultural

labor force decreased by approximately 13%, and has been decreasing, and is expected to continue decreasing (FAO 2001:c).

Gendered Dimension of the Epidemic

The Framework emphasizes that women are especially vulnerable and susceptible to HIV/AIDS due to social and physiological reasons (USAID 2002b). However, what seems to be dismissed and ignored, is that women are also more vulnerable to nutritional problems, due to their lower social and economic status, and physiological needs (FAO 2002i: 1). To elaborate further, 98% of rural women defined as economically active in Tanzania are involved in agriculture, and produce a substantial share of the food crops for household consumption, and export (FAO 2001k:2). Furthermore, approximately one-third of households in Tanzania are headed by women (FAO 2001k). In addition, women's incomes are "significantly and directly related to children's nutritional status" (FAO 2001k). Because most Tanzanian women play a dominant role in rural agriculture production, they are the backbone of food production and provisioning, in the household, and in the nation. Thus, the overall food security and nutritional well-being of the household and nation depend on women's capabilities, to produce and provision an adequate and reliable supply of nutritious food. (See: FAO 2001k, l, m, PCHPA 2002, Spring 1987).

Suggestions

The national response to the HIV/AIDS pandemic in Tanzania needs to consider and address, that food insecurity, malnutrition, and hunger related illnesses, are underlying causes and consequences of "poverty" and the high

prevalence of HIV and AIDS in Tanzania. The understanding of the synergistic relationship among malnutrition, immune function, and infection needs to be integrated into the general thinking, and communication of HIV and AIDS. Likewise, this understanding needs to be incorporated into the development and implementation of strategies to eradicate "poverty", hunger, malnutrition, and HIV and AIDS. These issues affecting the nation of Tanzania, and Tanzanians, need to be addressed holistically; not in isolation from each other. (de Haen 2001, Karanja 2001, van de Sand 2001, Swaminathan 2001, Windfuhr 2001).

"Poverty" cannot be effectively and sufficiently addressed without considering the interconnected and overlapping issues constituting: HIV and AIDS, malnutrition, agricultural productivity, and gender inequality. Concerning the gendered epidemic of HIV and AIDS, the roles women play in agricultural production, food security, and nutrition, and provisioning of food in the household, and the nation, need to be addressed. Integrating this more holistic understanding of the HIV and AIDS pandemic will provide for a more effective and sufficient way to address, prevent, and treat HIV and AIDS in Tanzania, as well as other nations affected by high rates of malnutrition, "poverty", and HIV and AIDS. (Gillespie and Haddad 2002, Piot *et al*, (See also: Brough 2002, Bwire 2002, Correspondent 2002, de Haen 2001, De Waal 2002, Egal and Valstar, FAO 2001a, b, c, d, e, f, g, h, i, j, k, l, m, FAO 2002a, b, c, d, e, Foster 2002, Future Harvest 2001, Gardner and Halweil 2000, Gari 2002, IRIN Correspondent, Karanja 2001, Piwoz and Preble 2001, Reid 1997, Romeyn 1998, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002, Rosset 2002, van de Sand 2001, Sen 1981, Swaminathan 2001, Wafula 2001, Windfuhr 2001).

Conclusion

According to dominant thinking of HIV/AIDS, AIDS is a health condition caused by the human immunodeficiency virus. The virus progressively weakens the immune systems of HIV seropositive people to the point where they are not able to combat, and eventually die from, common infections and viruses. (CDC 2002d, e, f, g, Hutchinson 2001, NIAD 2001b, c).

In sub-Saharan Africa many common and chronically experienced illnesses, such as malaria, diarrhea, tuberculosis, typhoid, cholera, and parasitic infections, weaken immune systems (CDC 2002a, Lwanga 2001, USAID 2002). People living with compromised immune systems, such as those who are malnourished, experience further weakened immunity from recurring bouts of malaria and other viruses and infections. People with weakened immune systems are more susceptible to contracting HIV, than people who have healthy and functioning immune systems. For HIV infected individuals, episodes of malaria and common infections further compromise immunity and intensify risks of reaching full-blown AIDS; a stage characterized by severe bodily wasting and imminent death. (CDC 2002c, d, e, f, Kean *et al* 1999a, g, Lwanga 2001, NIAD 2001c, USAID 2002).

Current research on HIV/AIDS in the context of sub-Saharan Africa emphasizes the interconnection of HIV/AIDS and nutrition. This research asserts nutrition plays a crucial role in: preventing HIV; prolonging overall health and longevity for people living with HIV; progression of HIV to AIDS; and dramatic escalation to full-blown AIDS (Egal and Valstar 2002, Kean *et al* 1999a, g, Lwanga 2001, PCHPA 2002, Piwoz and Preble 2001, Romeyn 1998, Root-Bernstein 2002).

Highlighting nutrition as an important factor in the acquisition of HIV, AIDS, and progression of HIV to AIDS calls for a rethinking of the AIDS pandemic (Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002). This theoretical connection offers hopeful and tangible ways to think about, and devise strategies to combat HIV and AIDS. Implementing intervention and development strategies based on the understanding of a symbiotic relationship among HIV, AIDS, and nutrition is especially needed in the context of Tanzania in sub-Saharan Africa, where HIV seropositivity and AIDS rates are high, and malnutrition rates are among the most severe in the world (PCHPA 2002). In Tanzania, approximately 8.1% of the population are HIV seropositive, and 41% of the population, including children and adults, are malnourished (PCHPA 2002:).

In addition to promoting education on safe-sex practices, providing education on the importance of maintaining overall nutrition and health as a means to prevent HIV and AIDS acquisition, and treat HIV seropositive people, is essential to combating the AIDS pandemic (Egal and Valstar 2002, Kean *et al* 1999a, g, Lwanga 2001, PCHPA 2002, Piwoz and Preble 2001, Romeyn 1998, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002). This thinking humanizes the escalating HIV/AIDS scourge in Tanzania, and in other countries severely affected by the HIV/AIDS pandemic and malnutrition. Furthermore, this thinking assists in de-stigmatizing HIV/AIDS and restoring dignity to people living and dying with a health condition, commonly associated with socially and culturally immoral behavior (Baylies *et al* 2000, Maletsky 2002, Nath 2000, The Panos Institute 1990b, Root-Bernstein 1990, 1992, 1993, 1995, 1997, 2002, Setel 1993, 1999).

In Chapter 1, Background Information, I explain the development of my thinking and analysis of HIV and AIDS, which is based on two and a half years of study, and ten months of lived experience and research in Tanzania. I mention experiences, reflections, and queries which forced me to rethink what I had learned, and "defamiliarize" concepts and terms commonly used and alluded to in AIDS research, such as "poverty" and "promiscuity" (Hornborg 2001). In questioning what I had learned, and remaining open and engaged, I realized issues of food security, malnutrition, and hunger are largely dismissed and ignored in AIDS research. These issues are not implicated as underlying causes and consequences of "poverty", and HIV and AIDS in sub-Saharan Africa. From these realizations, I started to question the focus, and ethical implications of biomedical and socio-cultural research, premised on issues of sexuality and "poverty". In all, these experiences, reflections, and queries structure the epistemological and methodological framework and results of this thesis, and pattern future work.

Chapter 2, Two Theories of HIV/AIDS Pathogenesis, outlines the dominant biomedical theorization of HIV/AIDS; HIV causes AIDS, and an alternative theory; the co-factor theory. In explaining the phases of infection according to the dominant theory, I highlight the fact that in "developing" countries, the interval between phases, and from infection to death, is generally much shorter, than in industrialized countries. In explaining the co-factor theory, I highlight the fact that this theory considers the role that malnutrition plays in the acquisition, and pathogenesis of HIV and AIDS. This point is particularly important in the context of Tanzania in sub-Saharan Africa, and other "developing" regions afflicted by high rates of HIV, AIDS, and malnutrition.

Chapter 3, Malnutrition, explains what malnutrition is, and how it is caused. Malnutrition is contextualized globally, as well as in industrialized and "developing" countries. Hunger related malnutrition is contextualized in the continent of Africa. More specifically, hunger caused malnutrition is contextualized in sub-Saharan Africa, where rates are exceedingly high, and as opposed to other "developing" regions, are expected to increase. Furthermore this chapter illustrates the synergistic relationship of malnutrition, immune function, and infection, and highlights the implications of this relationship to comprehending the pathogenesis of, and addressing, HIV/AIDS.

Chapter 4, Tanzania, contextualizes "poverty", malnutrition, and HIV and AIDS in Tanzania. These issues are addressed and highlighted by briefly tracing the history of Tanzania, from independence to present, and the challenges Tanzania faced, and continues to face, in building a solid infrastructure, and agriculture base. This chapter shows how these challenges affect food security, "poverty", and related issues of malnutrition and illness; including HIV and AIDS. This chapter also highlights the Tanzanian national response to HIV/AIDS. I argue that the national response to HIV/AIDS, premised on communicating sexual behavior change, is limited because it fails to address the interconnected issues of: the gendered dimensions of agricultural productivity, food security, and malnutrition, which underlie "poverty", and HIV and AIDS.

Suggestions for Further Research

A transition in thinking of the HIV/AIDS pandemic is needed, from a "disease" primarily caused by sexual transmission, to a health condition highly correlated to issues of food insecurity and malnutrition. A change of thinking which incorporates the aforementioned issues, should be reflected in biomedical and socio-cultural research, and prevention, intervention, and treatment strategies on HIV and AIDS. This transition in thinking, research, and action is most needed in the context of "developing" regions of the world, where HIV, AIDS, and malnutrition rates are high, and access to expensive HIV and AIDS medicines is largely intangible for most people in need (Weissman *et al* 2001).

The following topics of research are needed to encourage, and actualize the transition: 1) More research needs to be conducted, with recourse to follow, which demonstrates the important roles women play in agricultural production and provisioning of nutritious food, at the household and national levels (FAO 2001a, b, e, k, l, m). This research should be cautious not to idealize women as "heroic 'African female farmers' " (di Leonardo 1998:296) or essentialize women as earth mothers and victims (Shiva 1989); these depictions legitimate subordination (Karam 2001). 2) More information is needed to elucidate the effects of the HIV and AIDS pandemic on agricultural practices and overall nutrition (FAO 2001f, g, h, 2002a, c, e). 3) Issues of food security, hunger, and HIV and AIDS, need to be incorporated in "poverty" eradication strategies (de Haen 2001, Swaminathan 2001, Wilcock 2001, Windfuhr 2001. 4) Access and rights to food security, health, and medical treatment, need to be realized and treated as human rights (de Haen 2001, Ngongi 2001, Valente 2001, Wilcock

2001, Windfuhr 2001). Similarly, withholding, or demanding incredulous prices for HIV and AIDS medicines (Weissman *et al* 2001) from people in need, should be viewed and acted upon, as violations of human rights.

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