



The Link between HIV/AIDS and the Environment

By

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List of Acronyms

ABCG	African Biodiversity Collaborative Group
AIDS	Acquired Immunodeficiency Syndrome
ART	Anti-retroviral Therapy
ARV	Anti-retroviral
ASALS	Arid and Semi-arid Lands
AWF	African Wildlife Foundation
CBNRM	Community Based Natural Resource Management
CBO	Community Based Organization
CD4	Cluster of Differentiation 4
CDC	Centre for Disease Control
CI	Conservation International
CIFOR	Centre for International Forestry Research
CRC	Coastal Resources Centre
DRC	Democratic Republic of Congo
FHI	Family Health International
FSD	Foundation for Sustainable Development
HAART	Highly Active Anti-retroviral Therapy
HEBI	Horticultural Ethical Business Initiative
HIV	Human Immunodeficiency Virus
ILO	International Labour Organization
IPPF	International Planned Parenthood Federation
IUCN	The International Union for Conservation of Nature
KWS	Kenya Wildlife Service
MAC	Mycobacterium avium complex
NASCO	Namibia Association of CBNRM Supporting Organizations
NGO	Non-governmental Organization
NRM	Natural Resource Management
OCRA	Organization for the Conservation of Natural Resources and the Combat of HIV/AIDS
PCP	Pneumocystis carinii pneumonia
PEACE	Population, Gender Equity, and AIDS in Coastal Environments
PRB	Population Reference Bureau
SOAN	Society for Orphans and AIDS Network
SUCCESS	Sustainable Coastal Communities and Eco -Systems
TB	Tuberculosis
TICAH	Trust for Indigenous Culture and Health
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WRI	World Resources Institute
WWF	World Wildlife Fund

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This study was part of a larger project, *Making the Linkages – Conservation as a Core Asset for Livelihood Security in Eastern Africa*, funded by the International Development Research Centre (IDRC). The project aims to improve the understanding of the importance of sustainable natural resource management for livelihood security and economic growth in Eastern Africa. The project focuses on the following poverty-environment linkages: HIV/AIDS and the environment, drylands and marine natural resources and livelihoods.

The major activities of the project are: 1) conducting community workshops and producing community lessons learned brochures to improve the understanding and awareness of the linkages at the community level; 2) carrying out more in-depth studies on the linkages; 3) initiating community-policy dialogues and interactions to improve understanding at the policy level and 4) influencing policy at the IGAD level through studies and conferences of directors of conservation and health and economic planners to facilitate the dialogue between the different sectoral senior decision-makers.

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Executive Summary

It is estimated that 1.5 million people have died of HIV-related illnesses in Kenya since the first case was diagnosed in 1984. A total of 1.8 million children have been left orphans, and 1.4 million people are currently living with the disease. The high level of dependence of the majority of Kenyans on natural resources means that they have turned to these same resources for solutions in the management of HIV/AIDS. This has therefore put additional pressure on the natural resource base.

The study found that there are both direct and indirect linkages between HIV/AIDS and the environment/natural resources. Factors in the environment can either enhance or inhibit the spread of HIV. Malaria, that is endemic in some parts of Kenya, increases the transmission of HIV as do many sexually transmitted diseases.

The study also shows that herbal medicine is widely used and reduces the risk of infection when used for sexually transmitted infections and febrile illnesses such as malaria. The herbs also slow down disease progression when used to treat opportunistic infections. The same herbs can, however, lead to accelerated disease progression if not used properly such as when used in combination with ARVs or when preferred to ARVs. Unfortunately, the increased demand for herbal remedies is resulting in their over-exploitation and the threat of their extinction. Similarly, there has been an increased use of wild foods and timber due to the pandemic.

Progression of disease is also accelerated by poor hygiene and sanitation which leads to the spread of infectious diseases among PLHIV. Poor disposal of HIV contaminated materials, such as condoms, syringes and home-based care kits poses a threat to communities, especially in the informal settlements in Kenya's urban areas.

The indirect linkages between HIV/AIDS and natural resources include the fact that areas with abundant natural resources tend to attract many people, including those who are running away from stigma due to their HIV status. The key sectors of fisheries, commercial agriculture and tourism tend to create conditions that make people more likely to get infected with the virus. Factors such as mobility, availability of cash and lack of social inhibitions due to distance from family in these sectors contribute to the spread of HIV.

The HIV/AIDS pandemic has also had an impact on the land tenure systems of communities, while at the same time; some of the existing land tenure systems have put more people at risk of contracting HIV. When productive members of the household have passed on, the remaining members may lease the land or leave it fallow. Further, following the death of men from HIV, their widows are sometimes denied their rights to inherit the land and may be forced from the marital home. The sub-division of group ranches, and the subsequent sale of land that is registered under private title, has also contributed to the spread of HIV, as irresponsible land owners have used the money for alcohol and commercial sex.

The impacts of HIV/AIDS on conservation have included the loss of staff and loss of the investment of training them, the cost of meeting medical bills and the cost of recruiting new staff. At the community level, the pandemic makes it difficult for agencies attempting to promote community conservation initiatives to do so, due to the heavy demands on the communities' time to attend to the sick and bury the dead. In some cases, conservation efforts have put communities at risk of contracting HIV, such as when they have been evicted from forests and other conservation areas that previously served as their homes and sources of livelihood.

Rural-urban migration is sometimes prompted by the limited options available for rural communities to eke out a living from a degraded environment with poor soils due to over cultivation and grazing. People who travel to urban areas in search of employment are placed at risk of infection, which then makes them conduits through which the virus is introduced to the members of the community in their rural homes.

Some of the existing initiatives to address issues arising from the linkages between HIV/AIDS and natural resources include projects to generate knowledge and share it with others. Several organizations and networks are involved in this, such as the African Biodiversity Collaborative Group (ABCG), the Population Reference Bureau (PRP), the Food and Agriculture Organization (FAO), the Swedish International Development Agency (SIDA), the Southern Africa Development Community (SADC) and the Coastal Resources Centre (CRC). These organizations have conducted surveys and produced research papers, toolkits and guidelines, aimed at addressing different issues related to HIV and NRM.

Other initiatives are focused on tackling specific emerging issues, by assisting communities to develop more effective coping mechanisms. These include initiatives that target high risk groups within high risk sectors, by educating them on the risks and providing them with sustainable options for using natural resources to address their livelihood needs.

At the organizational, national and international levels, policies are being formulated to tackle the HIV/AIDS issue and mainstream effective responses within different sectors, such as forestry, conservation, fisheries and land.

Due to the complexity of the HIV/AIDS pandemic, with regard to the social and economic factors that contribute to its spread, it is important that a multi-sectoral approach is adopted when tackling specific concerns.

It is therefore important to draw lessons from those communities and countries that have had success in different aspects of the issue, and up-scale and replicate these initiatives after analysing how they should be modified to suit the different social and cultural contexts.

1. Introduction

There has been a growing realization that AIDS is not just a health crisis, but a challenge to development since it affects all spheres of the social, cultural and economic aspects of life, especially in the worst-affected countries. To date, there is scant information about the direct and indirect linkages between HIV/AIDS and the environment and natural resource management (NRM) in the Eastern Africa region. This realization resulted in the formation of a partnership between the African Regional office of the International Planned Parenthood Federation (IPPF) and the Eastern Africa Regional Office of the International Union for the Conservation of Nature (IUCN-EARO) with the aim of promoting greater understanding of the linkages between HIV/AIDS and the environment. IPPF and IUCN commissioned studies in four countries of Eastern Africa; Kenya, Uganda, Sudan and Tanzania and facilitated national level workshops. A regional workshop is scheduled to take place later in 2008.

1.1 The Consultation Process in Kenya

In Kenya, the initial activities involved the contracting of two consultants: one with a medical background and the other with a natural resource management background to conduct a desk review of available literature on the subject. The consultants enriched the literature review with field visits to sites where either IUCN or IPPF had existing projects, during which additional information was generated through focus group discussions and key informant interviews with representatives of communities and stakeholders in the HIV/AIDS and environment sectors. This field research was conducted around Eldama Ravine, Kisumu, Nakuru and Thika towns (Annex 1 provides the list of the organizations that were visited).

The Consultants' preliminary findings were presented during a workshop entitled "*Community Lessons Learnt - Workshop on Establishing the Link between Environment and HIV/AIDS in Kenya*" that was held in Nakuru 9th to 11th June 2008. This workshop was attended by community members from Koibatek, Nakuru and Kisumu municipalities and included People Living with HIV/AIDS (PLWHA); representatives of NGOs that provide services to those affected and infected by HIV/AIDS; and environmental and development NGOs. The workshop generated discussions about the communities' experiences with the linkages between environment and HIV/AIDS. In addition, the community representatives generated action plans and compiled a list of recommendations which were presented to local and national level policy/decision-makers during the final day of the workshop. This report provides highlights from the literature review, the field research and the workshop deliberations.

2. HIV/AIDS in Kenya

The first identified case of HIV/AIDS in Kenya was recorded in 1986 (Ministry of Health, 2008). The disease spread rapidly during the 1990s reaching a prevalence of 20-30% in some areas of the country (NACC, 2005). Recent surveys have shown that the prevalence rates are dropping from a previous national rate of over 10% to 7.4% in 2007 (Min. of Health, 2008). This could be due to an increased death rate given that new infections are still continuing. It is estimated that 1.5 million people have died of the disease, 1.8 million children have been left orphans, and 1.4 million people are currently living with the disease (NACC, 2005).

According to the Preliminary Report of Kenya AIDS Indicator Survey (KAIS) that was conducted in 2007, of the more than 1.4 million Kenyans living with HIV/AIDS, as many as four out of five of them do not know their status (Min. of Health, 2008).

Therefore, many of them are not accessing antiretroviral therapy (ART), although it is the most effective intervention for prolonging survival in people with HIV and when taken regularly, is associated with a 90% reduction in mortality. This is despite current guidelines from the Ministry of Health that recommend ART for all HIV-infected adults with CD4 counts less than 250 cells/ml and for those with counts below 350 cells/ml depending on their clinical status. In 2007, about 65% of the people who needed ARVs were not on them; the reason for this for the majority of them (63%) was that they did not know their status.

When the CD4 lymphocyte counts drop below 200 cells/micro litre, then the stage of clinical AIDS has been reached. This is the point at which people have advanced HIV infection and are vulnerable to infections and malignancies called “opportunistic infections” because they take advantage of the opportunity offered by a weakened immune system. Some of the common HIV-related opportunistic infections and diseases include:

- Bacterial diseases, such as tuberculosis, Mycobacterium avium complex (MAC), - that affects lymph nodes, spleen, liver and marrow, bacterial pneumonia and septicaemia (blood poisoning).
- Protozoal diseases, such as Pneumocystis carinii pneumonia (PCP), - which is the most frequent opportunistic infection seen with AIDS, toxoplasmosis, microsporidiosis, cryptosporidiosis, isosporiasis and leishmaniasis.
- Fungal diseases, such as candidiasis, cryptococcosis and penicilliosis.
- Viral diseases, such as those caused by cytomegalovirus, herpes simplex and herpes zoster virus.
- HIV-associated malignancies, such as Kaposi’s sarcoma, lymphoma and squamous cell carcinoma.

Source: AIDS Pathology (2007) and Kanabus A. et al. (2007)

The Ministry of Health recommends that everyone diagnosed with HIV take cotrimoxazole (CTX, also known as Septrin), an antibiotic that reduces the risk of early mortality as well as rates of hospitalization, malaria, diarrhoea and pneumonia. Unfortunately, more than 80% of the people who need CTX are not on it, mainly because they do not know their status.

Although infection with HSV-2 virus that causes genital herpes is usually life-long but not life-threatening, the presence of genital herpes in a person increases their chances of acquiring HIV; while in a HIV-infected person, genital herpes increases his or her chances of transmitting HIV. The Kenya AIDS Indicator Survey (Ministry of Health, 2008), indicates that in 2007 about 81% of adults with HIV also had genital herpes; while 32% of adults who did not have HIV had genital herpes and were therefore at increased risk of acquiring HIV.

According to Laith (2006), malaria increases HIV transmission and could lead to more than 8,500 infections in sub-Saharan Africa. This is because during malaria episodes, the viral load of those infected rises markedly and this facilitates HIV transmission. Malaria also triples the risk of transmission of HIV from mother to child (Tenenbaun, 2004).

There are many factors that are known to determine the epidemiology of an infectious disease. The epidemiological factors include host factors, i.e. factors in a patient that are genetic in nature (Torrence, 1997). They also include characteristics of the pathogen, the ability of the virus to survive inside the patient as well as to perpetuate itself inside and beyond the patient. Lastly, they include environmental

factors. The environmental factors may increase susceptibility or resistance to infection and include factors such as geographical location, biological attributes of the place such as the kind of plants and animals in the area, climate, and topographical features. These factors influence the epidemiology of a disease by influencing nutrition, lifestyle, housing and occupation of the individual. While it is possible that the rate at which the disease spreads and conquers the immune system could be influenced by these environmental factors, this linkage has not been critically considered.

3. Natural Resource Use in Kenya

The majority of the people in Kenya rely on natural resources for their livelihood needs. The Economic Recovery Strategy for Growth and Wealth Creation: 2003-2007 (GoK, 2003), estimates that 67% of Kenya's population live in rural areas, where agriculture is the main source of subsistence and cash income, with the key cash crops being tea, coffee, sugarcane, pyrethrum, horticultural crops such as flowers, fruits and vegetables and the main food crops being maize and beans. Another important source of revenue is tourism, which relies on the country's natural resources, including wildlife and the sandy beaches of the coast. The fisheries industry, especially around Lake Victoria and at the Coast is another key source of subsistence and income.

About 70% of the population of Kenya reside on the 12% of the land that is classified as being of high to medium agricultural potential, while the remaining 30% of the people live on the 88% of the land that is arid and semi-arid (MENR 2002). The population is therefore unevenly distributed with urban areas having the highest densities, followed by agricultural areas, some of which have densities of more than 300 people per Km², while some ASALs have about 3 people per Km² (MENR 2002).

Kenya's five "Water Towers" of Mount Kenya, the Aberdare Range, the Mau Forest Complex, Mount Elgon and the Cherangani Hills, are the forests that form the upper catchment of all the main rivers in Kenya (Akotsi, E.F.N., et al. 2006). Currently, Kenya's closed canopy forests occupy only 1.7% of the total land area (UNEP, 2001). The highest population densities are found around these forests, due to the agricultural productivity of the land.

The ASALs support about 50% of the national livestock population and host most of the national parks and reserves, thereby making a significant contribution to the tourism industry. Pastoralism is the main production system of the people in the ASALs.

According to UNDP, 50% of Kenyans lived below the poverty line in 2005. Compared to 2004, the number of people living in abject poverty had increased¹. Due to the heavy reliance on natural resources for the majority of Kenyans, coupled with existing poverty levels, the HIV/AIDS pandemic is putting additional pressure on the natural resource base. Because of HIV/AIDS, communities are also changing the manner in which they define rights to land and other land-based resources, with stigmatization of HIV positive people making them become more marginalized.

4. Linkages between HIV/AIDS and Natural Resources

The linkages between HIV/AIDS and the environment and natural resources are both direct and indirect. Direct linkages include changes in resource use that are directly

¹ Conversely, according to the 2007 Kenya government report, *The Basic Report on Well-being in Kenya Based on Kenya Integrated Household Budget Survey – 2005/06*, 46% of the population lives below the poverty line. The report indicated that in 2005/06 poverty had reduced, from 56% of the population six years previously.

prompted by HIV infection, such as the increased demand for and use of certain natural resources by the infected. Indirect linkages between HIV/AIDS and natural resources include behaviour around natural resources pre-disposing people to infection and the impacts infections have on the capacity to sustainably manage natural resources due to increased infection rates.

5. Direct Linkages

In literature, the main direct linkages between HIV/AIDS and natural resources identified include the increased use of herbal medicines, wild foods and timber and non-timber forest products by the infected and their families.

5.1 Increased Use of Herbal Remedies

According to the World Health Organization, the majority of the world's population, especially those in developing countries, rely on traditional forms of medicine, largely plant-based, to meet their primary health care needs. In many parts of Kenya, this percentage is higher. For example, according to Nyariki, D.M. et al. (2007), 87% of the households in the Lembus Forests study area use herbal medicine, a slightly higher percentage than the national average of 75%.

A variety of factors contribute to this. For example, many people have limited access to conventional medicines because the expense, distance, and lack of knowledge of the existence of conventional medicines to treat respective ailments. In addition, many people have more trust in herbal remedies than in conventional medicines. Many plants considered weeds also have medicinal properties (Njoroge, N.G., et al. 2004).

Although currently the government is offering free ARVs (since June 2006) and food supplements, the cost of travelling to access them is prohibitive for many. For example, it costs Ksh. 230 to travel to Eldoret from Eldama Ravine (a total of Ksh. 460 to and from) for the ARVs. HIV positive people are required to get their CD4 count measured, before they are given their first or next dose of ARVs; with doses usually given every two months. Inquiries about why the local hospital cannot do the CD4 count test revealed that at Ksh. 4.2 million, the CD4 count machine is very expensive and therefore out of reach for many facilities. Furthermore, many people do not know that they can get free ARVs and food supplements. These are some of the reasons why people continue to rely on herbal medicines, which are relatively easy to access as compared to conventional medicines.

The demand for herbal remedies has increased due to the HIV/AIDS pandemic, which has also resulted in their greater commercialization. Interviews with a Maasai herbalist at Eldama Ravine revealed that many herbalists travel far distances, with their herbal remedies. He was one in a group of Maasai herbalists from Namanga, who travel to different parts of the country and to the neighbouring countries of Congo, Sudan, Somalia and Ethiopia, selling their herbal remedies. The Namanga forests are their main source of plant material, including bark, roots, berries and leaves. This particular herbalist did not claim to cure HIV/AIDS, although it is likely that he has provided herbal remedies for some of the opportunistic infections. Another respondent in Eldama Ravine reported how a lady who was very sick with HIV/AIDS paid Ksh. 5,000 for a two-week dose of a herbal concoction from a herbalist based around Kakamega Forest and is now doing much better.

A 1998 report by Marshall N. identified 102 plant and 29 animal species used in medicinal treatments in East and Southern Africa, that were priorities for conservation and management action, because they were becoming scarce.

Box I: Examples of wildlife species identified as priorities for action in the 1998 report
Searching for a Cure: Conservation of Medicinal Wildlife Resources in East and Southern Africa

Plant species

Aloe sinkatana: Both the leaves and leaf exudate of this Sudanese succulent are valued to treat a variety of ailments, including skin diseases, constipation, fever and inflamed colon. This species is depleted in the wild and propagation is recommended.

Baobab Adansonia digitata: The fruit and bark of this tree are used to treat dysentery. While it has a widespread distribution throughout the region, it is becoming scarce in Eritrea and Sudan. This scarcity at local level should be regarded as a potential trend and signal to neighbouring countries to more closely examine their own use of this resource.

Prunus Africana: The bark of this afro-montane tree is used to treat prostrate problems. Since 1990 Kenya has exported approximately 1100 tonnes of bark, and Madagascar has exported over 4 tonnes of extract to France. Surveys should be carried out to determine the population status of this tree, which became subject to international trade controls under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1994.

Warburgia salutaris: The root and bark of this tree are valued to treat colds, coughs, headaches and stomach problems. This species is identified as a priority for management and propagation in Mozambique, Swaziland, Zambia and Zimbabwe. In addition, an investigation of the trade in Swaziland is recommended.

Animal species

African Rock Python: This species is in demand for medicinal use in almost all countries surveyed. Its skin is used to treat sexually transmitted diseases and the back for backache. It is identified as a priority for action in Malawi, Mozambique, Namibia and South Africa.

African Wild Ass: The meat, blood and fat are used to treat a variety of ailments. This critically endangered species is in need of increased protection in Eritrea, where medicinal use combined with other threats, such as hunting and interbreeding with domestic donkeys, poses a grave threat to its already precarious status.

Cape Pangolin: The scales and blood are used to treat a variety of conditions such as heart problems and also as good luck charms, for rain making and to protect against bad omens and bullets. It is identified as a priority for study to determine the volume and impact of trade in Malawi, Mozambique, Namibia, South Africa and Tanzania.

Green Turtle: The oil of this turtle is used to treat many conditions. In Kenya, where illegal local and international trade is occurring, the oil is believed to cure more than 40 ailments, from scabies to tuberculosis. This species is identified for priority action in Eritrea, Kenya and Tanzania. In Eritrea, the genitalia are used and there are exports to Saudi Arabia. The scale and impact of this trade should be examined.

Source: Marshall N. (1998).

Unfortunately, many plant and animal species are facing the threat of extinction, especially when they are identified as having the potential to contribute to the management of HIV/AIDS. According to Eniang (2007), the 1993 discovery of the tropical moist forest vine *Ancistrocladus korupensis*, whose leaves are said to have a certain alkaloid, michellamine B, which demonstrated *in vitro* activity against the AIDS viruses HIV-1 and HIV-2, has received a lot of publicity. Consequently, it has virtually disappeared from many forest areas following excessive un-regulated exploitation for traditional medicines and native concoctions which local producers claim are capable of curing HIV/AIDS or as an antidote for contracting the disease. The tribal communities living around the internationally reputed national parks within

the Gulf of Guinea tropical moist forest areas where this vine was first reported, have one interest or another in this mystery plant. The problem does not end there, but has affected many other plant species as well as wild animals.

Mark Meyo and Mary Chege are trained to give home-based care to PLHIV. They both reported that due to the greater awareness about the effectiveness of the "Peace Plant" (*Plumeria alba*) in the management of *herpes zoster*, a common opportunistic infection among PLHIV, it has been over-harvested around the Nakuru municipality. Similarly, *aloe vera* and neem trees are also facing threats because they are increasingly being used by PLHIV.

The Warden of Koibatek County Council, Mr. Kimosop, reported that there has been a growth in the illegal bush meat trade especially because many traditional doctors are recommending that their ailing patients either consume the soup, meat or oil of specific wild animals, which are believed to have special properties. Therefore animals such as porcupines, rock hyraxes, warthogs and turtles are increasingly being targeted by communities seeking to follow the prescriptions of their traditional healers.

Use of herbal medications in the treatment of malaria, and sexually transmitted infections plays a role in controlling the spread of HIV given that the presence and spread of these diseases increase the spread of HIV. All herbalists interviewed reported that they treat genital ulcers, pain on urination, urethral discharge and vaginal discharge. They also treat patients with fever and other symptoms of malaria.

Quote 1:

"Sexually transmitted diseases are very common around here. I always have herbs ready for my clients. They come with pain in the abdomen and the back. Some have pain on urination. When they are not treated on time, the thing breaks and produces pus in the private parts. They also get a rash or even wounds in their private parts."

Alice Awino, a herbalist in Dunga Beach, Kisumu

An initial list of species used in treating various ailments was compiled by the community of people living with HIV/AIDS in collaboration with officers from IUCN and the Forest Department. Annex I contains a list of medicinal plants used by communities living around Lembus Forest.

Demand for herbal remedies is growing, especially due to HIV/AIDS, and also because many people prefer herbal remedies to conventional medicines for several reasons. Initially, ARVs were being sold and were therefore out of reach for many people; hence their reliance on herbal remedies. However, even when ARVs are offered free by the government, limited knowledge of HIV as well as confusion of the disease with witchcraft in some communities make people avoid hospitals. As a result, many people continue to rely on herbal medicines which are believed to have curative and cleansing powers and which are relatively easy and cheap to access.

According to the Preliminary Report of the Kenya AIDS Indicator Survey (Ministry of Health, 2008) as many as four out of five people who are HIV-infected do not know their status; meaning that although they could benefit from ARVs, they do not access them. Instead, many of them continue to rely on herbal remedies to treat their opportunistic infections. In the long run, this growing demand has meant that in some places, herbal remedies have become more expensive than conventional medicines, especially ARVs which are offered free of charge. Peter Mwai, an HIV positive workshop participant reported that currently, only the rich can afford to be on herbal medicines because the costs are prohibitive.

Cirus Wanyoike, a herbalist with Kamirithu Herbal Clinic in Thika, reports that herbs are hard to get. He says the problem got worse after big industries started manufacturing herbal products such as soaps, lotions and toothpaste, while relying solely on wild stocks since they are yet to support the farming of medicinal plants. According to Wanyoike, herbs are now sourced from the neighbouring countries of Uganda, Tanzania, and Democratic Republic of Congo which makes herbal remedies expensive and with limited future sustainability.

Quote 2:

"Herbs are becoming very hard to get. There is a very high demand now. It seems everybody has turned to herbal remedies. They even buy them from around here and carry them away to other towns and even other countries. Right now I am short of Aloe vera. There is a specific species we use which is no longer available here. Someone has been bringing it to us from Baringo but he has not come of late."

Isaac, a herbalist in Nakuru

5.2 Increased Misuse of Herbal Medicines

While herbal medications may have important uses in HIV care, inadequate knowledge about them, including how they interact with ARVs, remains a big challenge. According to Gray (2007), herbal remedies may induce liver enzymes or other proteins resulting in increased metabolism of drug binding. This renders ARVs ineffective and accelerates resistance and drug failure.

It is also notable that herbalists are not bound by medical ethics and the advice they give to patients may sometimes be contradictory to known scientific facts. The District HIV/AIDS Coordinator (DASCO), Nakuru, reported that herbalists, who had been members of the Constituency AIDS Committees, were recently expelled from these committees for misleading patients on the effectiveness of herbal medications in treating HIV. Mark Meyo, a project officer at Love and Hope Centre, Nakuru, reports that the centre, which specializes in working with PLHIV, has witnessed five cases of patients ceasing to use ARVs and resorting to herbal medications. Three of the five have since died. Sister Imelda, a Home-based Care Officer with Kisumu Urban Apostolate Program, reports that some patients believe so much in herbal medication that they refuse to go to hospitals even when they are referred there by the Officers during home based care visits. They drink, chew, apply on the skin and even bathe in herbal concoctions.

Esther Mugure, a PLHIV from Thika, reports that there are herbalists who claim to treat HIV. She says she knows two people who were treated by herbalists and are said to have turned negative. She also knows others who have been on herbal medications and whose condition has markedly deteriorated.

From interviews with key informants, three major problems seem to accompany use of herbal medication: refusing conventional medication, stopping conventional medication if use has started, or mixing up herbal and conventional treatments. The proportion of HIV patients on ARVs, anti-TB drugs and other treatments and who currently face these challenges is not known.

Quote 3:

"Sometimes the herbs are brought to the patients by relatives who are not aware of the HIV status of the patient. The patient who wants to maintain confidentiality of his status will take the herbs even if he has been warned against using them so as to ward off suspicion and please the relatives."

Mark Meyo, Love and Hope Centre, Nakuru

Adherence counselling, which would ordinarily have solved this problem, is very weak on herbal remedies and lacks standard messages to be passed to patients on this subject. Furthermore, there has been little research into the interaction between ARVs and herbal remedies that are commonly used in different parts of the country.

Text Box 2: Interaction of ARVs and Herbal Medication

Data from one hospital in New York State indicate that 34% of patients receiving Highly Active Anti-retroviral Therapy (HAART) use herbal therapy on a regular basis. However, only 54% of patients told their clinicians that they were using herbal therapy, and 62% of the time, clinicians were unable to predict which patients used herbal therapy.

Drug interactions are known to occur when PIs are used concurrently with St. John's Wort or garlic supplementation. Concurrent use of St. John's Wort and un-boosted indinavir resulted in a 57% reduction in indinavir AUC. Data also demonstrated that concurrent saquinavir soft-gel capsule and garlic supplementation reduced saquinavir plasma concentrations by 51%. After a 10-day washout period, the saquinavir AUC, trough, and C_{max} were only 60% to 70% of baseline levels, suggesting an ongoing effect. In the setting of PI- or NNRTI-based HAART, supplemental garlic and St. John's Wort are contraindicated. All herbal products should be used with caution until further data are available regarding their effects on concurrent HAART.

Milk thistle has been used in HIV-infected patients due to its potential hepatoprotectant effects. Although initial concerns about its concurrent use prompted many clinicians to avoid milk thistle in combination with PIs and NNRTIs, recent data suggest that the use of milk thistle with indinavir does not cause a clinically significant interaction.

Source: Johns Hopkins University School of Infectious Disease, 2007.

People respond differently to the use of herbs. Sarah Kamau, a project manager with International Community for Relief of Starvation and Suffering (ICROSS), says that they simply discourage their clients from using herbs. Interestingly enough, herbalists on the other hand insist that their patients must stop using conventional medicines, including ARVs if they are to treat them with herbs.

Quote 4:

"People come to us for treatment after the conventional hospitals have failed. They know that herbs are better than medicines from hospitals. That is why they come..... You asked about HIV patients? I treat many. They get well after treatment but they must come early because at some stage the disease is untreatable..... When they come they must stop medicines from the hospital. You cannot mix the two. When you use only one then you can differentiate the one with more power. We advise them to stop using the medicine from the hospital before they start using our herbs. It is upon them to choose what to do..... If they are not improving, we refer them..... We do not refer them to the hospital though; there are other herbalists we refer them to."

Edward, a herbalist at the Nakuru Municipal Market

5.3 Increased Use of Timber and Non-Timber Forest Products

Other resources that have been put under increased pressure due to HIV/AIDS include timber, especially for the making of coffins. According to some reports, the high rate of HIV/AIDS related deaths in the western part of the country is putting additional pressure for timber, especially illegally harvested, on Kakamega Forest

(Hammarskjold, M., 2003). Timber is also being sourced from neighbouring countries, especially the Democratic Republic of Congo for use in the making of furniture and coffins (pers. comm. with a Carpenter at Dagoretti Corner, 2007).

In Uganda, communities are using bamboo and reeds from the Bwindi National Park to transport the sick and the dead from hospitals. The HIV/AIDS pandemic is resulting in greater demand for these products from the forest (Dwasi, J., 2002). Another impact of HIV/AIDS is the increased use of fuel wood during funerals, for cooking, lighting and heating, especially for communities with lengthy burial ceremonies. This has been reported in Southern Africa (CIFOR, 2006) and in several parts of western Kenya .

5.4 Increased Use of Wild Foods

One of the impacts of HIV/AIDS is a reduction in labour for agricultural production, both as a result of the loss of productive members of the household and the additional burden of looking after the sick. There is a tendency for greater reliance on wild foods, including fruits, vegetables and bush meat, for households that have been affected by HIV/AIDS. These meet a critical need for HIV infected people, because nutritional deficiencies increase susceptibility to opportunistic infections (Piwoz and Preble, 2000).

Around the Lembus Forests, the diversity of wild foods collected from the forests include white ants, honey (both from regular and sting-less bees), mushrooms, wild vegetables, such as *Solanum nigrum* (*managu*) and *amaranth* (*terere*) and fruits, such as *syzigium guineensis* (*lamaiywet*). Many of these are used both for their nutritional as well as medicinal values. Small game is also hunted from the forests and provides an alternative source of protein. The forest is also used to graze livestock and for manure, which is collected from the forest floor.

Due to their nutritional and medicinal attributes, some specific resources are being over-harvested. In South Africa, due to the belief that turtle eggs cure HIV/AIDS, communities around the marine reserves in Kwazulu Natal have increased their collection of turtle eggs, both for their use and for sale in other parts of South Africa. Over-harvesting is also affecting the African Potato (*Hypoxis rooperii*) in Southern Africa, which is used with other plants to manage HIV/AIDS related ailments (Dwasi, 2002, and WHO/AFRO, 2001). Greater commercialization of herbal remedies often means that there are larger numbers of people harvesting them in the wild, sometimes without the requisite knowledge of proper harvesting methods.

Nutrition remains a pillar in the management of HIV. Without good food, ARVs alone do not provide the desired results. The role that wild foods play in prolonging the lives of PLHIV who cannot afford other sources of food is yet to be quantified, but is definitely significant. According to CIFOR (2006), forests are increasingly becoming the main safety net for households impacted by HIV/AIDS.

Box II. 'Children's foods': The role of wild edible foods in reducing childhood vulnerability to HIV/AIDS aggravated food and nutrition insecurity in central Kwazulu-Natal

When asked to account for how they cope with food shortages, a group of AIDS orphans stated simply: "When we are hungry, we go out and play." This association between children's play and food security may not at first be obvious, but many wild edible foods have been referred to as 'children's foods', and it seems they may be increasingly important for children, orphans and vulnerable groups within the context of heightened HIV/AIDS food and nutrition

insecurity. This position was supported by research carried out among children in a rural area in central KwaZulu-Natal, South Africa, where HIV/AIDS vulnerability is high and 4-5% of children under the age of 15 are maternal orphans. Among a sample of vulnerable children, birds, rodents, wild fruits and tubers were key sources of food - especially for boys - who commonly spent prolonged periods of time away from the home, playing, hunting and foraging for food.

As Simo*, an orphaned nine year old boy living with his grandparents, noted: *"We get worried when there is no food in the house, and we cope sometimes by just drinking water and sleeping, or we go and ask neighbours for help. Then we go and hunt and shoot birds. We look to the trees and if the trees are bare, we rip potatoes of the mountain from the ground and roast them in our fires"*. Maternal orphan Xolane* (11) explains: *"If we feel like we want to eat meat, we just go out into the forests because we are craving. We are familiar with these areas, so we have no problem going there."*

For hungry, often socially alienated orphans, hunting birds, foraging for food and trapping animals is not only an important coping strategy for dealing with food insecurity, but is also a fun and sociable peer activity.

Thobane* (9) explained: *"Yes, we eat these foods because we are hungry, but we don't just want it because we are hungry, we want to taste how nice it is, keep the ball rolling, keep surviving."* As a result, birds and small mammals are frequently eaten with a regularity that even rivals the consumption of more conventional staples. Reportages of catching and consuming birds and bushmeat 2-3 times a week was not uncommon, with many children setting traps in the morning before school, and checking them on a daily basis. As Mlungise* (10) explained: *"I eat them at any time I can! Every day on school holidays! Every weekend! Often after school!"*

* Pseudonyms

Source: CIFOR, 2006.

Mark Meyo of Love and Hope Centre in Nakuru reported that wild fruits and vegetables play a big role in sustaining families affected by HIV/AIDS.

Quote 5:

"Recently I went to visit one of our members who had gone public on her HIV positive status. I found her very sick and unable to come out of bed. Unfortunately the husband was similarly sick. They have two young children, both below ten years. They had run out of food and the children were hungry. They told the children to go out into the wild and pick any vegetables they could come across. I know families which do this and even take whatever they get to the market to raise income for other needs."

Mark Meyo, Love and Hope Centre, Nakuru

5.5 Environmental Factors That Increase Transmission of HIV

Infection with the HIV virus manifests itself through reduced immunity, making the infected person more susceptible to a variety of opportunistic ailments. It is therefore important to reduce the exposure of HIV infected people to disease causing agents, such as bacteria and to mosquitoes which are vectors for malaria causing parasites.

Malaria, which increases the risk of HIV transmission, is a disease that is dependent on environmental and climatic conditions. Malaria is endemic in parts of the country such as the Coast, Nyanza, Western and parts of Eastern Provinces. This risk spreads to highland areas when, due to environmental degradation resulting in warmer than normal conditions, highland malaria outbreaks occur (Kanzaria, 2007). Such outbreaks have been seen in Kisii Highlands and parts of Nandi Hills in the recent past.

A recent study by Professor Robin Weiss shows that a gene that apparently evolved to protect people from malaria increases their vulnerability to HIV infection by 40% (BBC News, 2008). Around 90% of the people in Africa carry this genetic variation. This further confirms the strong linkage between the environment and HIV prevalence.

5.6 Environmental Sanitation and Its Role in HIV

HIV *per se* does not kill but rather the opportunistic infections that come as a result of a weakened immune system. It is therefore important for HIV-positive people to reduce their exposure to some of the germs that threaten their health. They should be especially careful around uncooked meat, domestic animals, human excrement and lake or river water. However, there is no practical way to reduce exposure to the germs that cause candidiasis, MAC, bacterial pneumonia and other diseases because they are generally common in the environment. (Kanabus A., et al., 2007).

Lack of adequate toilets, especially in informal settlements, coupled with the failure of many municipal councils to collect waste are factors that contribute to the spread of infections, especially typhoid, cholera and amoeba. Phelgona Atieno Otieno, an environmental health specialist with the Kisumu Urban Apostolate Programs, reported that many people who are infected with HIV were dying early due to infections acquired in the dirty environments they live in. The Safe Water and AIDS Project, based in Kisumu, was founded to address the adverse effects of an unsanitary environment on PLHIV. According to Alie Eleveld, the manager of the project, diarrhoeal diseases that were common among PLHIV have decreased since the project started providing education on hygiene and using chlorine tablets to treat drinking water while responding to the outbreak of infectious diseases.

HIV control through the use of condoms has received wide acceptance by many communities. However disposing of used condoms remains a big challenge. According to Mary Chege, a trained home-based care-giver, lack of proper waste disposal, especially of HIV contaminated materials such as condoms, syringes and used home-based care kits is a major issue of concern, especially within the expansive informal settlements that are part of Kenya's main cities and towns. Community members reported that there are many incidences of children playing with condoms from dump sites and people being pierced by syringes that are disposed of with other household waste. Municipal council employees and people who collect and dispose of waste are especially at risk and often lack proper protective clothing when they are working. The Director of the National AIDS Control Council (NACC) admitted that apart from advising on safe disposal of contaminated items, the Council had not done any other work on the issue. Similarly, the National Environmental Management Authority (NEMA) indicates that they currently do not have projects focusing on HIV and the environment, although they realize that this is an area that needs attention.

Contaminated water further exacerbates the health of PLHIV. For many years, communities were advised to boil drinking water, in order to make it safe. However, the high cost of fuel discourages many households from boiling water, often meaning that they are taking contaminated water. Several organizations, including the Safe Water and AIDS Project, are promoting the use of chemicals to purify drinking water. Treating water with chemicals that go by the brand names of *Waterguard*, *Pur*, *Aquaguard* and *Aquatab*, packaged either as tablets or in liquid form, has proven to be much cheaper and more accessible to many communities than boiling water. However, communities are sometimes resistant to using water treatment chemicals

due to the different taste of the water and fears that these chemicals could interfere with their reproductive systems.

Quote 6:

"Women no longer cut trees to boil water. We have trained and sensitized them to use Water Guard. It is easy to use. Boiling is not environment friendly and not women friendly. It would require them to fetch fuel wood when they are sick. Women living with HIV also sell our products (water pots and chlorine tablets) and this earns them an income. This has helped in improving their quality of life and reduced stigma in the community."

Alie Eleveld, Safe Water and AIDS Project, Kisumu

5.7 Poor Housing and Ventilation

In both rural areas and the informal settlements of urban centers, the most common forms of fuel are wood, charcoal and paraffin. The poor ventilation that characterizes a lot of these houses contributes to respiratory diseases, which are exacerbated by the cramped living conditions, whereby whole families share small rooms. Opportunistic infections, that are common among HIV positive people such as tuberculosis and pneumonia spread very fast in such settings. In order to reduce the risk posed to PLHIV, the Tumaini na Fadhili CBO is promoting the use of the "fire-less" cooker; an insulated basket into which hot food is placed to continue cooking using the latent heat. The CBO is also promoting the use of energy saving stoves that use much less fuel than the traditional stoves. These technologies not only reduce the labour required to fetch fuel wood but also assist in conserving trees.

6. Indirect Linkages

In addition to some of the direct linkages between HIV/AIDS and the environment and natural resources, there are several indirect linkages. Indirect linkages include environmental factors that do not necessarily result in the spread of HIV/AIDS, but which in reality do. Below are some of these indirect linkages.

7. Abundant Natural Resources as "Magnets" for People

Areas with an abundance of natural resources tend to act as magnets for people, especially those seeking employment, those running away from stigma and the ones who have been ostracised by their respective communities. The convergence of people from different places and cultures leads to complex social relationships and in many cases the spread of HIV. The following examples illustrate this.

7.1 Fisheries

Fishing communities are often among the highest-risk groups in countries with high overall rates of HIV/AIDS prevalence. Vulnerability to HIV/AIDS stems from complex interacting causes that may include the mobility of many fisher folk, the time fishermen spend away from home, their access to daily cash income in an overall context of poverty and vulnerability, their demographic profile, the ready availability of commercial sex in fishing ports and the sub-cultures of risk taking and hyper-masculinity among some fishermen (Allison E.H. and J. A. Seeley, 2004).

In Kenya, the fish landing beaches are characterised by ready cash, alcohol and commercial sex. In the article, *Marooned Island Where Sun Never Sets: Once Abandoned Isle on Lake Victoria has become a Busy Settlement Fuelled by Fish, Sex and Cash*, Otieno D.L. (2007) provides a graphic image of Ringiti Island off the Kenyan shores of Lake Victoria, and the factors that result in the spread of HIV/AIDS, including the abundance of fish. As one fisherman explains, "If you are a fisherman, you can decide to sell your fish for sex or for cash".

In addition, while in some areas women are coerced to submit to fishermen in order to get fish to process and sell, the trade-off has been reversed on Ringiti Island, with older women, mostly widows, now identifying young men who can assure them of a steady supply of fish in return for sexual favours. One woman, who was shunned by her community in Suba, after she lost three husbands “after long illnesses”, claiming that she had bewitched them, moved to the island to eke out a living from the fish. She is currently “married” to a man who has another wife on the mainland.

The World Fish Centre (2006) cites a comparative study of fisher folk and other “high risk groups” in selected countries that showed prevalence rates among fisher folk of 20.3% in the Democratic Republic of Congo, 24% in Uganda, and 30.5% in Kenya. These rates were between 4.5 and 5.8 times higher than in the general population and about twice as high as among truck drivers, who are conventionally considered a high-risk group.

Box III: Factors Increasing HIV Transmission along Lake Victoria Beaches

Dominic Atendo, the chairman of the fishing community at Dunga Beach, Kisumu, revealed the risky nature of life along the beach. He says that large numbers of people have been claimed by HIV. The community recently contributed money and came up with an orphanage to take care of the many children who had been orphaned.

He attributes the spread of the disease to:

- Ignorance of the disease by the fishing community;
- Migration of fishermen from one beach to the next and into the islands inside the Lake where they sometimes meet people from Uganda and Tanzania and where unprotected sex is common;
- Availability of easy money and lack of a saving culture, leading to careless use of money for alcohol and sex.

The community has now stepped up prevention programmes which include behaviour change communication with the fishermen; promotion and supply of condoms; training on saving and investment, including opening a beach bank; and development of a code of conduct at the beach that condemns exchanging fish for sex.

Source: Atendo, D. 2007

7.2 Commercial Agriculture

The abundance of key natural resources, such as rich soils and water, results in the establishment of intensive commercial plantations. In Kenya, there are plantations of the key cash crops of tea, coffee, sugar cane and horticultural crops, especially flowers. These plantations normally attract people seeking employment. Such plantations also act as havens for people who have been cast out by their communities, for various reasons, including because of HIV/AIDS.

In 1999, Kenya surpassed Israel and Columbia, to become the largest cut flower exporter to the European Union. Lake Naivasha, with its many surrounding flower farms is a classic example of intensive commercial agriculture. The flower farms around Lake Naivasha employ approximately 40,000 – 50,000 workers, 75% of whom are women (Opondo, M., 2005). However, every job attracts nearly seven other people to the area – especially dependents and others who come to look for employment. The high number of people migrating into the area has put a strain on the existing natural resources, increasing the amount of charcoal used, which is taken from the surrounding forests and drylands. Over-crowded living conditions, due to the limited number of houses available to host the workers, and sexual abuse are some factors that tend to promote the spread of HIV/AIDS (Ogondo O. 2007).

In Ethiopia, where the floriculture industry is growing at a rapid rate, concerns have been expressed on the need to proactively address the HIV/AIDS issue. According to a coordinator of an HIV/AIDS organization in Addis Ababa, “now, the majority of the workers come from nearby villages, but in the future there could be a crisis, if people are lured from around the country to work on the farms, living together in camp-like settings... this is when conditions are ripe for the spread of the virus” (Zeit, D., 2007).

There are two main flower farms in Eldama Ravine that provide employment for many of the squatters in the town; a large proportion of whom were evicted from the Lembus forests and settled in the town. According to Kimokiy (pers. comm. 2007), about three quarters of the approximately 500 households in the squatter settlement depend on the flower farms. However, they also subsidize their income from the flower farms by engaging in trading, charcoal production and sometimes in commercial sex work.

Similarly, areas with significant coffee and tea plantations, both large and small scale farms, tend to attract commercial sex workers, especially when “bonus” payments are made. When farmers deliver tea or coffee to their respective factories, they are initially paid a fraction of the total value of their tea or coffee. At the end of each year, the factories total each of the farmers’ deliveries and pay them the difference between what had been paid in advance and the total value. These yearly payments are referred to as “bonus” and can be quite substantial. The money is normally paid to the person in whose name the land is registered, meaning that although women and children perform most of the picking and tending of the coffee and tea, the “bonus” is deposited in the man’s bank account. Around the time of year when these monies are paid out, there is an influx of commercial sex workers.

A survey conducted by the government and UNICEF Kenya Country Office (2000) describes different districts in the study area, with regard to the factors that contribute to the spread of HIV/AIDS. According to the report, because of the favourable altitude in Kisii District, the people are able to grow tea and pyrethrum in areas lying above 1,000m, while at the lower altitudes coffee, sugarcane and bananas are grown. The high and reliable rainfall coupled with moderate temperatures make the area suitable for growing crops such as maize, beans, potatoes and groundnuts. It is also possible to practice dairy farming in the district. Most men, once they have received their earnings from their agricultural products, engage in extra-marital relationships. Earnings especially from the tea bonus attract twilight girls from as far as Nairobi and Kisumu.

There is strong evidence that commercial farming is particularly affected by AIDS:

- A study in a tea estate in Kenya found that those workers who ultimately died of AIDS had produced roughly one third less tea than other pluckers. They had also used significantly more leave days in the three years preceding death.
- On one sugar estate, a quarter of the entire workforce was infected with HIV. Direct cash costs related to HIV rose dramatically: company spending on funerals increased five-fold between 1989 and 1997, and direct health expenditure increased ten-fold. In addition, the estate’s managers reported greatly increased absenteeism, lower productivity (a 50% drop in the ratio of processed sugar recovered from raw cane between 1993 and 1997) and higher overtime costs as workers were paid to work extra hours to fill in for sick colleagues.

- A flower farm saw a similar ten-fold rise in spending on employee health costs between 1985 and 1995.

Source: Bollinger, L. et al. (1999) as cited by the World Bank website.

7.3 Tourism

Tourism is one of the top foreign exchange earners for the country, often competing with cash crops like tea and coffee. Big game safaris, mountains and sandy beaches are the main attractions for tourists coming to Kenya. Tourism is also one of industries which are considered high risk for HIV/AIDS infection. As more communities establish community conservation initiatives, they become exposed to tourism realities, including the lure of 'easy' money. This increases their risks of getting HIV/AIDS.

The HIV/AIDS Transmission Through Tourism Prevention Programme (HATP, 2007) notes that every year there is an influx of international tourists to the Kenyan beaches along the Indian Ocean for the famous 3 S (Sand, Sun and Sea) and the less talked of 4th S (Sex). There are many tourists who travel from overseas to engage in sex with the locals and/or to take pornographic pictures. The areas with the highest levels of prostitution, and other associated vices such as violence, drug/alcohol abuse and robberies are the Mombasa-Mtwapa area and the Watamu-Malindi area, since they are centres of mass tourism. A report by UNICEF (2006) observes that commercial sex tourism is not only growing rapidly along the Kenyan coast, but increasingly gaining acceptance as a valid means of earning an income.

7.4 Mining and Quarrying

The mining industry, especially in countries with substantial mineral deposits, is another industry that pre-disposes communities to the risk of infection by HIV/AIDS. Southern Africa and Tanzania face a much greater threat than Kenya, which has fewer minerals. In Kenya small scale mining is practiced in parts of Western Province (for gold) as well as in Macalder in South Nyanza, West Pokot in Northern Kenya, Kerio Valley in the Rift Valley, Kariandus near Nakuru, and Kibongwa near Kisumu. Big scale mining occurs in Athi River (for cement) and plans are underway to start mining in Kwale (for titanium). A study done by Amutabi M. (2001) in Mukibira, one of the small gold mining sites in Western Province, showed a high prevalence of illegal drugs, illicit sex, child abuse, defilement and child marriages. All these are risk indicators for the spread of HIV.

A workshop participant, Mark Meyo, reported that the Love and Hope Centre in Nakuru deals with many cases of HIV infections among people who harvest sand on the outskirts of the town. Due to the quick and relatively easy money that people get from sand harvesting, they tend to engage in risky behaviour which puts them at risk of infection by HIV.

8. Environmental Degradation Increases HIV Transmission

Environmental degradation and the resultant scarcity of key natural resources, such as water, fuel wood and fodder also contribute indirectly to the spread of HIV. The Carbon Footprints Limited and Escarpment Environment Conservation Network (ESCONET) are two organizations working to reduce environmental degradation of the escarpments of the Great Rift Valley. They have detailed records of how the escarpment has suffered from wanton destruction through charcoal production,

logging of timber and fuel wood, ring-debarking of medicinal trees and overgrazing. This has in turn resulted in the drying up of springs, rivers and streams, soil erosion, emigration of wildlife, including birds, increased temperatures, human-wildlife conflict and the scarring of the once beautiful and scenic landscape that generated income through tourism. The communities have therefore become even more dependent on the remaining forests for their livelihoods. Women and girls, who traditionally have the responsibility of fetching fuel wood and water for domestic use, have to travel longer distances in search of these resources. Their movements are often through lonely paths far away from homesteads, thereby exposing them to the risk of sexual assaults. Many incidences of rape have been reported in the area in recent times and it is not known how many people have been infected by HIV through these unfortunate experiences (Osur, 2007).

Quote 7:

“On Tuesday and Wednesday, different members of the mission team go on home visits. This is a very important part of our mission work. We need to not only see our patients in a clinic or hospital setting, but also to know how they live, to visit them in their homes. On one of the home visits, I met Angeline and her family. She is married and a mother of two young girls. She was 8 months pregnant and sick with AIDS, skin lesions present on her body. Her husband is HIV negative. Angeline was a victim of a rape (her only sexual encounter outside of her marriage). She became pregnant and HIV positive as a result of this sexual assault. She lost that child in a fire a few years ago. They live in a dark, dirt floor shack. She’s a beautiful woman, greeting us with the brightest, warmest smile as she invited us into her home. She loves her family, worries her husband may leave her, is concerned about her health, but lives a life full of strength, hope and faith. This is due to what Upendo Village has given her.”

Mary Jane Trinkus, a missionary, Upendo Village, Naivasha

Source: Trinkus M., 2007

One workshop participant from Kitale reported how, due to the scarcity of firewood, women are often forced to go into gazetted forests to collect firewood, often without the requisite permits which cost money that the women do not have. Increasingly, this exposes them to the risk of being raped, either by marauding members of the community or by forest guards, who sometimes demand sexual favours in return for allowing the women collect firewood. She told the meeting that she normally carries condoms when she goes to fetch firewood, so that in the event that she is attacked, she can plead with her would-be assailant to use one.

Examples of situations where scarce natural resources are being exchanged for sex are on the increase with participants citing two main examples of “Sex for Fish” along the landing beaches of Lake Victoria and “Sex for Firewood” in gazetted forests.

9. Impact of Land Tenure Systems on HIV/AIDS and Vice Versa

A majority of Kenya’s population depends on agriculture; therefore land is a key means of production for most people. There are many indirect linkages between the HIV/AIDS pandemic and the respective land tenure systems in the country, ranging from the customary to the statutory; communal versus private ownership; and also with regard to long term and short term rights to land.

In the pastoralist areas of Kajiado and Narok, changes from communal Group Ranches to the sub-division and private ownership of land have resulted in increased risks of contracting HIV/AIDS. When the Group Ranches get sub-divided and individual title deeds are issued, it then becomes easier for the owners to sell off this land. In some cases, the heads of the family in the mainly patriarchal Maasai

community sell off the land and use the money for liquor and commercial sex. The HIV/AIDS pandemic has therefore not spared these communities.

Around Mt. Elgon the land is agriculturally highly productive. There is a tendency for the head of the family, in whose name the land is registered to lease off some or all of the family land on a yearly basis. The money he receives is normally quite substantial. However, it is often used for liquor and commercial sex. HIV/AIDS is therefore introduced into the home. He may also use some of the money to marry a second or third wife. When the father dies, due to HIV/AIDS combined with poor nutrition and alcohol abuse, the sons inherit the land and the cycle continues (Matiru and Mwangi, 2005). HIV/AIDS results in an increase in the leasing of land in areas where this was not common, such as Nyeri in Central Kenya (Kiai, W. et al. 2002).

Loss of the active members of the household sometimes results in the remaining members, usually the young and elderly, being unable to tend the farms (Kiai W. et al. 2002). The land is therefore not intensively farmed. In one village in Rukai, Uganda, HIV/AIDS related deaths resulted in so much land lying fallow, that the bush encroached and with it, incidences of wildlife invading the surrounding farms increased (Dwasi, 2002). One of the benefits of this is the fact that the land is able to recover from years of being farmed.

Due to the stigma associated with HIV/AIDS, when the man dies, the widow and her children are not allowed by the community to inherit the land, and the woman may be accused of bringing the disease into the home. Therefore, this results in the disinheriting of many HIV/AIDS widows and orphans. According to Kiai W. et al. (2002), widows whose husbands died of HIV/AIDS are usually condemned and mistreated as the ones who have infected their husbands, and they are under massive pressure to leave their marital homes. This accusation of 'waywardness' is used to create disaffection and distrust of women in their society, further reducing their potential to hold their spouse's land in trust. One informant cited cases of women being divorced on declaring their HIV/AIDS positive status.

Certain cultural practices that were used by communities to ensure that all members were catered for are becoming risky to uphold due to HIV/AIDS. Wife inheritance, whereby a close relative of the husband married his widow to ensure that she and her children were looked after, is one such tradition. However, despite the risk, some women prefer to be inherited, as they see this as the only way they can protect their rights to the family land (Oyaro, K., 2007).

Following the disputed presidential elections of 2007, there was an eruption of violence in different parts of the country, especially Rift Valley, Nyanza, Western and Nairobi Provinces. The violence that was witnessed in Rift Valley was closely linked to feelings of resentment by indigenous tribes regarding tribes that had acquired land in those areas. HIV infection rates have risen due to rape during the eviction of the immigrant tribes. In addition, these communities spent many months in camps for the internally displaced, where rape and other irresponsible sexual activities have aggravated HIV transmission. The need to overhaul the land tenure system in the country has been highlighted as one way to avoid a repeat of the kind of violence that was witnessed.

10. Changes in Land Use Due to HIV/AIDS

Some of the most common changes in land use include where the land is left fallow, following the death of the active members of the household. In some cases, the death of key members of the household, especially the adults, results in the land

being taken over by relatives who continue to farm it. Leasing of land, due to a reduction in household labour, sometimes results in changes in land use. One consequence of HIV/AIDS is the farming of less labour intensive crops. For example, in Malawi, one study found that the production of cassava had risen, because it is not a labour intensive crop. Communities are also turning to wild, indigenous vegetables that do not require much tending, or farm inputs such as fertilisers and pesticides. According to the Eldama Ravine District Public Health Officer (pers. comm. 2007), indigenous vegetables, such as *amaranth spp. (terere)* tend to do well on abandoned farms.

11. Impact of HIV/AIDS on Conservation

Another impact of HIV/AIDS has been on the capacity of conservation organizations at the national, regional and community levels. Several studies have highlighted the fact that, because many people working in national conservation organizations tend to be away from their families for extended periods of time, this puts them at risk of HIV/AIDS. These organizations are increasingly being forced to deal with the costs of staff shortages, due to deaths and absenteeism. The costs of meeting medical expenses of HIV positive staff, as well as paying out terminal benefits are also diverting resources that could be used for conservation. When qualified staff are lost through AIDS, the organizations lose the investment they have made in training.

At the community level, conservation efforts are hampered by the impact of HIV/AIDS, as reported by Jared Odhiambo of Swedish Cooperative Centre-VI (SCC-VI) Agroforestry programme in Nyakach Division of Kisumu.

Quote 8:

“SCC-VI Agro-forestry was working with communities to conserve the environment. We however realised that HIV was interfering with implementation of our programme. We would organize community meetings but people fail to come because they were attending funerals or they themselves were sick. We also realized that the immediate need of people affected by HIV was not environmental conservation. We made a decision to mainstream aspects of HIV care into our programme so as to succeed in conserving the environment.”

Jared Odhiambo, SCC-VI Agro-forestry Programme, Kisumu.

Important traditional knowledge is also being lost, especially when people with special skills and knowledge pass on. For example, traditional animal tracking skills that are often passed on from one generation to the next are important for conducting animal population census and research, both for national conservation organizations and also for community conservation initiatives. Traditional knowledge on the uses of different species of plants and animals is also being lost due to HIV/AIDS.

HIV infections predominantly affect the most productive members of society of between 15 and 49 years (Were and Nafula, 2003). When infection or death occurs, it therefore affects the income and household well being. HIV leaves many orphans and vulnerable children (OVCs). Often, due to their limited access to options for earning an income to meet their needs, many OVCs turn to practices that are destructive to the environment, such as charcoal production, fishing using inappropriate or illegal gear and timber harvesting. Additionally, because people who are HIV infected are often stigmatized by their communities, they may be fired from their jobs or people refuse to buy goods from their shops. This therefore makes them look for the only available options to survive such as extracting natural resources, especially from forests.

Mark Meyo of Love and Hope Centre, Nakuru, reports that the centre at one stage had a client who was selling firewood to them. They made sure they always bought

the firewood from this client so as to give him some income. One day they visited the client at home and discovered that he was actually felling trees in a protected government forest to get the firewood for sale.

12. Impact of Conservation on HIV/AIDS Prevalence

In addition to HIV/AIDS impacting on conservation efforts, sometimes conservation efforts can make communities more susceptible to HIV/AIDS. When communities are re-located from areas of conservation priority, such as forests and wildlife rich areas, they tend to become more susceptible to HIV/AIDS. Dwasi (2002) gives the example of the Batwa and other community groups that were removed from Bwindi National Park in Uganda.

Box III: Impacts of Conservation on Vulnerability of Communities to HIV/AIDS

The Bakiga and the Bafumbira communities living adjacent to the Bwindi and Mgahinga forests in South-western Uganda depended on these areas for food, medicinal plants and spiritual and cultural needs. The forests also provided employment, especially to the men who are traditionally loggers and have special skills in pit sawing, and to the women who made baskets and other crafts with plant materials from the forests. In addition, the forests were home to the Batwa, a forest-dwelling community who did not know any meaningful form of life outside of the forests. In 1991, the forests were declared national parks (and Bwindi Forest declared a World Heritage Site) to enhance protection of the diversity of flora and fauna. One aspect of enhanced protection was a total ban on the use of the forests and resources therein, and the removal of over 2,000 Batwa people from the forests that had been their home.

The Bakiga and the Bafumbira lost their employment and income, and had to leave spouses and children behind and travel to Sesse Island, Kampala, and other far away places to sell their labour. Away from home and too poor to afford transport back to be with their families, they were "compelled" to engage in sex with other women and thereby exposed to the HIV virus and many of them have died of AIDS. In the words of many interviewees in the area, "they went to look for jobs and brought back corpses." Prohibition of the use of the forests by adjacent communities also increased idleness and alcohol consumption among those who did not go out to look for employment. In some cases, this led to them to engage in unprotected sex and to becoming infected with the HIV virus. Many of the homes in the areas surrounding the forests have only widows and orphans.

For the Batwa, the change came too suddenly. The people were not prepared to adopt a new lifestyle and having been made homeless, many moved to nearby towns where they became beggars and were exposed to sexual exploitation and the risk of infection with the HIV virus.

This situation shows the need for appropriate measures to be incorporated in efforts to conserve and manage natural resources in order to avoid exposing communities dependent on the resources to situations conducive to HIV infection. Thus, the conservation community has a responsibility to deal with HIV/AIDS issues when their actions significantly disrupt and impact on the livelihoods of local people who had previously used the resources of protected areas.

Source: Dwasi, 2002.

In the 1980s, people who were living in the Lembus Forests, and other gazetted forests in the country, were evicted. They became squatters on other people's land or moved into the urban areas. Currently, in Eldama Ravine town, there is one community of former forest dwellers who were evicted from the nearby gazetted Lembus Forests. This community engages in risky behaviour, such as the brewing of illicit liquor (*Chan'gaa*) and commercial sex work which pre-disposes them to HIV/AIDS. They are thus contributing to the spread of the virus among the other communities. Some of them work in the flower farms, but because of low wages,

subsidize their income with commercial sex work (pers. comm., Kiprono Kimokiy, 2007).

13. Impacts of Rural-Urban Migration on HIV/AIDS

About three quarters of Kenyans live in rural areas. Statistics indicate that the prevalence of HIV/AIDS is higher in urban areas than in rural areas. According to the National AIDS Strategic Plan (Republic of Kenya, 2005), prevalence rates showed significant regional and rural/urban variations, with average urban prevalence (10%) nearly twice that in rural areas (5-6%). However, the Kenya AIDS Indicator Survey (Min. of Health, 2008) reported that from 2003 to 2007, there had been a 58% increase in the HIV infection rates in rural areas. As of 2007, 7 out of 10 HIV infected adults are rural residents.

One of the factors are contributing to this rise in infections among rural residents is rural-urban migration. There is a tendency for young people living in areas with degraded environments, or with few alternatives for eking out a living, to move to urban areas in search of employment. The urban lifestyle, including the crowded living quarters in the informal settlements, alcohol, drugs and limited social inhibitions toward sex, pre-dispose many young people to HIV infection. Once infected, many of them return to their rural homes, initially for visits and later for good as their health deteriorates. Similarly, there are many men who leave their families in the rural areas and travel to the urban areas for employment.

Other factors that contribute to rural-urban migration include the limited inheritance rights women have on ancestral land. Unmarried women who get children and women whose husbands die are sometimes evicted from the ancestral land by their families, especially the male relatives, who see them as adding to the number of people who will inherit the limited land. As reported by Kiai, W. et al. (2003), women whose husbands die of HIV/AIDS are sometimes accused of having brought the disease to the home and evicted. A reduction in the productivity of land, due to soil erosion and over-cultivation, coupled with numerous sub-divisions of ancestral land, often mean that it cannot support many people.

14. Existing Initiatives: Linkages between HIV/AIDS and NRM

There are several initiatives at the local, regional, national and international levels to address issues around the linkages between HIV/AIDS and natural resources. Several of these initiatives have been geared towards generating knowledge on the subject. Some have moved forward to respond to specific issues of concern, while others involve the formulation of policies and laws to mainstream responses to issues of HIV/AIDS, including within the context of natural resource use and management.

14.1 Generating Knowledge

Several agencies and networks have commissioned studies to gain a better understanding of the linkages between HIV/AIDS, the environment and natural resources. These include:

The African Biodiversity Collaborative Group (ABCG)

The African Biodiversity Collaborative Group (ABCG) is an initiative of six U.S. – based international conservation NGOs with field-based activities in Africa. These are the African Wildlife Foundation (AWF), Conservation International (CI), International Union for the Conservation of Nature (IUCN), Wildlife Conservation Society, World Resource Institute (WRI), and World Wildlife Fund (WWF). ABCG meets regularly to explore emerging conservation issues, share lessons and identify opportunities for

collaboration. ABCG is funded through a grant from the John D. and Catherine T. MacArthur Foundation.

The ABCG has commissioned studies on HIV/AIDS and natural resource management linkages, including linkages between HIV/AIDS and coastal biodiversity, agriculture, the natural environment, forests (and their role as safety nets), fisheries, parks, conservation capacity, and the role of gender. ABCG has also produced a series of documents specifically on community-based natural resource management activities and coping strategies that address HIV/AIDS impacts. These include an AIDS toolkit for community based NRM, and case studies on the Great Limpopo Trans-boundary NRM initiative; Bushbuckridge in the Northern Province of South Africa; the policy guidelines on HIV/AIDS by the Namibia Association of CBNRM Supporting Organizations (NACSO); the Organization for the Conservation of Natural Resources and the Combat of HIV/AIDS (OCRA) of Kenya; and activities on HIV/AIDS and land and resource use by the Wildlife and Environment Society of Malawi.

On the Internet, the ABCG is hosted by the Frame program, which is a USAID-funded program to build knowledge-sharing networks of natural resource management professionals. Frame's Knowledge Sharing for the Natural Resource Community, fosters discussion on emerging trends and provides timely and relevant information on innovative strategic options to address these issues.

Population Reference Bureau

The Population Reference Bureau (PRP) provides information on US and international population trends and their implications. PRP has commissioned studies on the linkages between HIV/AIDS, land use and natural resources. One of the studies was a review of existing literature. In collaboration with USAID and the Coast Resources Centre, PRP has also produced Guidelines for Mitigating the Impacts of HIV/AIDS on Coastal Biodiversity and Natural Resource Management. USAID, Coastal Resources Centre, PRP and IUCN have produced a study on HIV/AIDS and Threats to Coastal Biodiversity in Tanzania and the Cross-Sectoral Dimensions of HIV/AIDS, Gender, and Population Dynamics in Critical Areas.

Food and Agriculture Organizations (FAO)

The Food and Agriculture Organization of the United Nations (FAO) has commissioned several studies on the linkages between HIV/AIDS and agriculture, land use and land tenure (Drimie, S., 2002 a and b and Kiai W. et al. 2002).

The Swedish International Development Agency

The Swedish International Development Agency (SIDA) has produced a study entitled *The Environment, Natural Resources and HIV/AIDS* (Hammarskjold, M. 2003). Further, SIDA in collaboration with FAO, the International Organization of Migration and the World Fish Centre organized an international workshop in Zambia, together with the Ministry of Agriculture and Cooperatives and the National AIDS Council entitled *Responding to HIV and AIDS in the Fishery Sector in Africa* (WorldFish Centre, 2006).

14.2 Creating Awareness and Sharing Knowledge

Once knowledge has been generated and lessons learnt from experience, there is need to share these with a broader audience, in order to enrich interventions. Several initiatives that are targeted at creating awareness and facilitating the sharing of knowledge on different dimensions of HIV/AIDS are outlined below.

Regional AIDS Training Network (RATN)

The Regional AIDS Training Network (RATN) is a network of organizations dealing with HIV/AIDS in the Eastern and Southern Africa regions. RATN promotes training and capacity development for Sexually Transmitted Infections (STIs), and HIV/AIDS. RATN offers courses that range from 2-4 weeks in duration on diverse HIV/AIDS related issues, including counselling, laboratory management and methods in support of ARV programs, communication and behaviour change, gender and HIV/AIDS. With regard to HIV/AIDS and natural resources, RATN offers a course on Traditional and Modern Healers and Practitioners together against AIDS (RATN, 2006).

SADC Meeting on Nutrition and HIV/AIDS

In 2002, the Health Sector Coordinating Unit of the Southern Africa Development Community (SADC) organized a meeting that was attended by 50 people, drawn from health departments, UNICEF country offices, UNAIDS officials, traditional healers, affected individuals and international lecturers to discuss the role of nutrition in improving the health of people living with HIV/AIDS. The sessions included discussion on the role of traditional remedies and foods in the management of HIV/AIDS (Giraldo, R., 2002).

Bridging the Gap between Traditional and Western Medicine

In 2006, the Zambian government commissioned the first clinical trials of remedies dispensed by traditional healers who claimed to have found an AIDS cure. Initial indications showed that each of the three formulae that were tested had its own unique healing properties, with some increasing the patients' CD4 count while others reduce the viral load, or simply treat a number of opportunistic infections, like coughing, rashes and tuberculosis. However, the National AIDS Council was quick to clarify that Zambia was not claiming to have found a cure for HIV/AIDS (IRIN, 2007).

14.3 HIV/AIDS Sector-Specific Initiatives

In addition to generating knowledge, there have been several sector specific initiatives to respond to issues and concerns about HIV/AIDS and natural resources. Examples include initiatives in coastal resources, fisheries, agriculture and conservation.

14.3.1 HIV/AIDS and Coastal Resources

The PEACE (Population, Gender Equity, and AIDS in Coastal Environments) project builds on existing Integrated Coastal Management programmes and projects in Tanzania and integrates the crosscutting themes of HIV/AIDS, population, and gender into coastal conservation and resource management initiatives in the coastal districts of Pangani and Bagamoyo. It is implemented by the Coastal Resources Centre of University of Rhode Island and the Population Resources Centre with funding from USAID. In October 2006, the PEACE Project became part of the Sustainable Coastal Communities and Eco-systems (SUCCESS-Tanzania) Project, a five-year project funded by USAID (Torell E., et al., 2007).

The PEACE Project has produced the *Guidelines for Mitigating the Impacts of HIV/AIDS on Coastal Biodiversity and Natural Resource Management* (Torell E., et al., 2007). The project determined that HIV/AIDS-affected households increase the stress on the available natural resources, because they depend more on wild foods, wildlife, medicinal plants, timber and fuel wood in a bid to survive. Therefore, it has been implementing mitigating measures, such as helping women and other vulnerable groups, such as migratory fishermen and youth, to start alternative

livelihoods such as paprika farming and milkfish culture – livelihoods that do not further stress the coastal resources or threaten coastal biodiversity. Other measures include introducing fuel efficient stoves and establishing wood lots for fuel wood, to reduce pressure on mangroves and other coastal forests. The project also uses community theatre, in a bid to reduce risky behaviour and promote environmental stewardship.

14.3.2 HIV/AIDS and the Fisheries Sector

There have been different initiatives to address HIV/AIDS in the fisheries sector as explained below.

Box IV: HIV/AIDS in the Fishing Sector: ILO in Suba District, Kenya

Between 1998 and 2000, the International Labour Organization (ILO) implemented a Poverty Eradication Programme in some districts of Kenya. Noting the high mortality rate among fishermen and young girls, a study was conducted that revealed high rates of HIV. A pattern emerged of how HIV infection was transmitted. The study reported that local women had sex with fishermen in exchange for money or fish. The fishermen's wives and female fish traders from further afield came to the lakeshores on a weekly basis to collect money or trade fish, and could become infected. These women then return to their villages and cities, transmitting the disease to other sexual partners. In addition, Matatu (taxi) drivers from the cities also reportedly engaged in sexual transactions with women on the lakeshore, which further increases the sexual networks related to the fishing industry.

Money made by fishermen was not banked as there were no banking facilities, and the culture of saving did not exist. Therefore, while their families continued to live in abject poverty, money made from fish sales was used for sex with multiple partners.

District AIDS Committees consisting of community members were set up to sensitize people on HIV/AIDS, design prevention strategies, and train peer educators. The UNDP was approached to provide an immediate response by seconding a qualified HIV/AIDS expert to the district. A fish processing and storage complex in Mbita was rehabilitated and a Credit and Savings Union was formed to assist fishermen to save money. Community gardens were also established.

Source: Chuma -Mkandawire, S., in WorldFish Centre, 2006.

14.3.3 HIV/AIDS, Nutrition and Herbal Remedies

The Tumaini na Fathili Community Nutrition Program in Nakuru was founded in 2003 by a team of people who had undergone a training of trainers course in Home-based Care and some community volunteers. The organization provides home-based care as well as establishing community based health and nutrition counselling support sites, with components of food security and income generating activities. They have produced a booklet on nutrition, especially for PLHIV titled 'Your Nutrition Health Ladder'. The organization also produces and promotes energy-saving technologies and nutritional supplements.

Urban Harvest is an initiative of the Collaborative Group on International Agriculture Research (CGIAR) that was created to respond to the reality that although most of the CGIAR centres concentrate on rural agriculture, urban agriculture is a reality in most of the developing countries. The Nakuru Urban Harvest project is a collaborative initiative with University of Toronto, Ryerson University, the International Livestock Research Institute (ILRI) and the Badili Mawazo Self-Help Group, which is a group of people living with HIV/AIDS. The project supports the group members to construct goat and chicken houses and to establish kitchen gardens using organic farming techniques and manure from the livestock and from urban organic waste.

The project is conducting extensive research into these initiatives with the aim of lobbying policy makers to allow regulated urban agriculture, which is currently illegal in East African urban centres.

The Society of Orphans and AIDS Network (SOAN) manages various healthcare, poverty eradication and microfinance initiatives in the Coast Province of Kenya to prevent and mitigate the impact of AIDS and related opportunistic diseases on communities. An intern from the Foundation for Sustainable Development (FSD) worked with SOAN and other CBOs to prepare educational posters and a resource booklet about nutrition and herbal remedies. These tangible resources will support efforts to expand awareness and empower CBO staff and community members to cost-effectively prevent and manage macronutrient malnutrition.

Future FSD interns have the opportunity to address macronutrient malnutrition and subsequent diseases through public awareness and education campaigns. Interns may also work to improve public access to herbal remedies and the resources needed to improve general nutrition. Those interns with business skills may wish to promote the development and sale of herbal remedies as a business opportunity that supports community health, ensures the proper preparation and use of such remedies, and empowers the community to manage their health with local resources (FSN, 2007).

Similarly, the Trust for Indigenous Culture and Health (TICAH) has produced a herbal and nutritional guide for Kenyan families (TICAH, 2006). The authors initially intended to exclusively focus on HIV-positive children and their families but realized that the conditions that affect the HIV-positive child can also affect any child in Kenya.

14.3.3 HIV/AIDS and the Flower Industry

In response to public outcry and market demands, the flower industry in Kenya has attempted to implement activities to mitigate against HIV/AIDS. As an example, the Horticultural Ethical Business Initiative (HEBI) was registered in 2003 and it seeks to promote more responsive practices among the flower farms, with regard to the way they treat their employees and address critical issues around HIV/AIDS (Opondo, M. 2005). Additionally, several of the flower farms have sought certification under various schemes that promote sound social and environmental practices, such as the Fair Trade Mark.

14.3.4 HIV/AIDS and Conservation

According to Dwasi (2002), KwaZulu Natal Wildlife has implemented HIV/AIDS intervention strategies to prevent and/or minimize the impacts of long periods of illness and frequent HIV/AIDS deaths on the agency and its activities. The agency's strategies are laid out in its HIV/AIDS policy that allows for and authorizes a variety of measures including:

- Controlled harvesting of plant resources from their protected areas and the propagation of medicinal plants to avoid their depletion and negative impacts on biodiversity;
- Periodic HIV/AIDS awareness and education of staff;
- Condom availability for staff;
- Medical boarding of staff unable to continue performing conservation duties and activities; and
- A well-being programme with various components including voluntary counselling and HIV testing, links with traditional healers, arrangements for

discounts and networking with health and HIV/AIDS NGOs and the provincial government for antiretroviral drugs and other benefits for people with HIV/AIDS.

Box V: War on HIV/AIDS on at the Kenya Wildlife Service

Despite the fact that estimates given by the Kenya Wildlife Service (KWS) HIV/AIDS office are scaring, the campaign against this scourge seems to have begun in earnest, and the rapid test results on the same are encouraging, to say the least!

According to Salome Kangethe, the HIV/AIDS Coordinator, "While statistics on HIV/AIDS related deaths in our work place have been an issue of great concern, we at the HIV/AIDS office and more so, the Human Resource Department, are optimistic that since this campaign is ongoing, we can see some light at the end of the tunnel."

Her optimism, Kangethe categorically states, is not based on fiction but on facts. "We have been able as an organization to draw on the funding of the Centre for Disease Control and Family Health International, among other donors. And with their generous funding, KWS has gone ahead to facilitate two seminars and two workshops all geared towards the campaign against HIV/AIDS."

"Soon, our strategy in winning the campaign on HIV/AIDS will be launched and from that point henceforth a concert of tactics and manoeuvres will be put in place to ensure that KWS wins this arduous campaign," a beaming Ms. Kangethe intimated. "Worrying as the figures on HIV/AIDS prevalence in KWS might look, no effort should be spared and especially in the area of avoiding new infections and more so, in the distribution of drugs to those of us who are infected."

Source: Kabukuru, G., (2007)

CARE International-Uganda, has assisted communities living around Bwindi and Mgahinga National Parks to establish health care clinics to provide medication and health care facilities and services. This has helped to drastically reduce reliance and over-harvesting of medicinal plants from the protected areas (Dwasi, 2002).

15. Community Knowledge in the Management of HIV/AIDS

It is emerging that although often poorly documented, communities have extensive knowledge and natural resource assets that they are using in the management of HIV/AIDS. A report by the World Health Organization's Regional Office for Africa (WHO/AFRO, 2001) indicates that there are currently many initiatives in Africa, whereby medical practitioners who use conventional medicines are collaborating with traditional health practitioners to test and refine their strategies for managing HIV/AIDS. Below are excerpts from this report.

Box VI: Traditional Medicines Show "Encouraging Results" in Management of HIV/AIDS.

According to information on traditional medicine received by the WHO Regional Office for Africa from its Member States, there are encouraging results being recorded from the growing collaboration between Modern Health Practitioners (MPHs) and Traditional Health Practitioners (THPs), illustrating progress in the area of prevention, care and management of HIV/AIDS.

For example, in one health facility in Burkina Faso which has had about 600 HIV/AIDS patients since January 2000, MPHs and THPs collaborate in HIV/AIDS case management with medicines produced by THPs but administered on patients by MPHs. Many of these patients have seen a significant improvement in their clinical condition. WHO is providing support for the preliminary evaluation of the safety, efficacy and quality of the herbal preparations used by patients at the centre.

Similar preliminary results have been reported in Nigeria following preliminary evaluation of two herbal preparations claimed by THPs to be effective against HIV/AIDS. These herbal medicines used for the management of Nigerian volunteers in a retrospective and a prospective study, brought about a marked improvement in symptoms such as diarrhoea, fever and oral thrush, all of which diminished after four to six weeks of therapy.

In South Africa, a herbal preparation developed by a local pharmaceutical firm is used as a tonic for diseases associated with significant loss of body mass. The information available from this country indicates that some 50% of patients experience a weight gain of between five and 10 kilograms within three to six months of use while 50% stabilize. A significant improvement in the mood, appetite, diarrhoea and sleep patterns of the patients has been also reported. Another product being sold in South Africa for case management of PLWA is *Hypoxis rooperii* (also known as the African potato).

In Uganda, often cited as a success story in Africa in the control of HIV/AIDS, MPHs and THPs have been working together since 1992 under the auspices of an NGO called Traditional and Modern Health Practitioners Together Against AIDS (THETA). The NGO was established to, among other things, conduct research on potentially useful medicines for HIV-related illnesses. THETA has observed that many of the herbal medicines used in Uganda by THPs have combated some opportunistic infections and generally improved the quality of life of PLWA. One such herbal preparation was used for the treatment of herpes zoster. It was concluded after preliminary studies that herbal treatments constitute important local and affordable alternatives in managing herpes in HIV/AIDS-infected persons in the country.

Malawi reports that the country's National AIDS Control Programme had been working with THPs and that the two bodies had jointly produced guidelines on how to prepare commonly used herbal preparations for various conditions. The guidelines itemize AIDS-related conditions such as abdominal pain, anaemia, cough and upper respiratory infections, diarrhoea, fever, general body pains, mouth and throat problems and skin infections, which can be treated with local herbs. The document includes the local names, parts of the plant to be used, route of administration and mode of preparation and dosage.

In Zimbabwe, one of the most seriously affected countries; members of the Zimbabwe National Traditional Healers Association (ZINATHA) have since 1993, started collaboration with some research and training institutions to evaluate the impact of herbal treatment on persons with HIV infection and assessed the quality of life of those persons with respect to HIV disease progression, including socio-demographic characteristics. The findings supported the role of herbal medicine in improving the quality of life of HIV-1 infected patients. WHO is providing support for the preliminary evaluation of one of the herbal preparations used for the treatment of HIV/AIDS in order to produce evidence on safety, efficacy and quality.

Other countries such as Benin, the Democratic Republic of Congo, Ghana, Mali, Tanzania, Togo, and Zambia have also undertaken laboratory studies on CD4 and or CD8, viral load, kidney and liver function tests on herbal preparations used for the management of HIV/AIDS. Results showed that these herbal preparations seem also to have alleviated HIV/AIDS symptoms. The difficulties that MPHs and THPs face in this type of study is the high cost involved; therefore financial resources have to be mobilized for further evaluation of efficacy, safety and quality of these herbal preparations.

Source: WHO/AFRO, 2001.

Through collaborative efforts, between research and academic institutions, NGO and local communities, community knowledge and experiences that are relevant to the management of HIV/AIDS are being documented. Resources such as the Herbal and Nutritional Guide (TICAH, 2006), based on community knowledge and research reports documenting the different uses of wild plants and animals in the management of diseases (such as Njoroge, N.C., 2004), are contributing to the growing body of knowledge.

According to the Eldama Ravine District Public Health Officer (pers. comm. 2007), there is growing use of indigenous vegetables and herbal remedies. Some community groups are collecting and/or growing these vegetables, drying, grinding and packing them for sale. He gave the example of stinging nettle (*hatha*), that is believed to treat joint pains. A group in Nyeri is drying the leaves, packing them and selling them for Ksh. 50 for a 50 gram pack. In addition, there is increasing interest in growing Atimiserin, the plant from which the newly introduced drug for malaria is produced.

One advantage is that many indigenous vegetables are not susceptible to pests; therefore there is no need to spray them with pesticides. However, the commonly used non-traditional vegetables, such as kale (*sukuma wiki*) and cabbage are now being sprayed with more potent pesticides, because many of the pests have become resistant. He reported that in some cases, farmers are using very poisonous soil fumigants, in order to ensure that their vegetables are free of pests, which in turn means that people are consuming more poisons with their vegetables.

16. Policy and Legislative Instruments

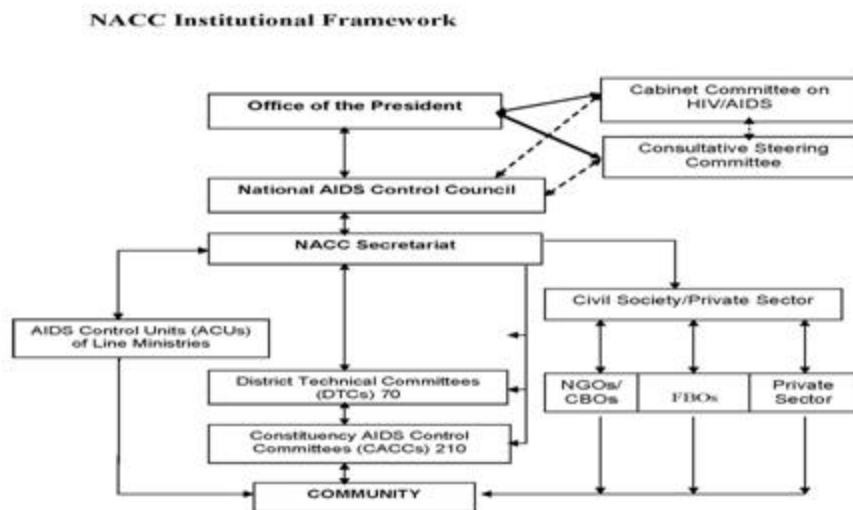
In 1999, the Government of Kenya declared the HIV pandemic a national disaster and established the National AIDS Control Council (NACC) to coordinate the multi-sectoral response to HIV/AIDS. Since 1984, when the first HIV/AIDS case was diagnosed in Kenya, the impacts of the disease have grown over the years, making it necessary for the government to formulate policies and legislative instruments to respond to the pandemic.

16.1 National Policies.

The government developed the policy guidelines in Sessional Paper No. 4 of 1997 on AIDS in Kenya and the then President of Kenya, Moi, declared AIDS a national disaster in 1999, and established the National AIDS Control Council (NACC) under the Office of the President, to coordinate a multi-sectoral response to the pandemic.

The NACC is decentralised, with the Constituency AIDS Control Committees coordinating activities at the local level (see diagram below) and also providing community groups with funds for their HIV/AIDS related activities. There are District Technical Committees and AIDS Control Units in the Line Ministries. The country's response to HIV/AIDS is meant to be guided by the Kenya National HIV/AIDS Strategic Plan (KNASP) 2005/6 - 2009/10 (National AIDS Control Council, 2005).

Diagram II:



Source: NACC Report (HIV/AIDS Situation in Kenya, 2005)

16.2 Sector Specific Policy and Legislative Instruments

In addition to the national policy and legal instruments on HIV/AIDS, the government has enacted, or is in the process of enacting, sector-specific policies and laws. Some of these are explained below.

Industrial Property Act, 2001

The Industrial Property Act of 2001 facilitated the greater importation of generic drugs for the management of HIV/AIDS. In 2006, proposed amendments to this Act were met with resistance both from government and civil society. A Task Force from the Ministry of Health recommended that the government not pass the said amendments, as they would reduce the level of access to cheaper generic drugs for the management of HIV/AIDS and other diseases (Ministry of Health, 2006).

Draft National Policy for Traditional Medicine and Medicinal Plants (TMMP)

The government has also formulated a Draft National Policy for Traditional Medicine and Medicinal Plants (TMMP). In January 2007, an inter-ministerial committee on the draft policy invited members of the public to debate on the policy, through several regional policy meetings. The overall objective of the draft policy is to promote the conservation and sustainable, safe and effective use of traditional medicine and medicinal plants, as well as to guide the integration of traditional medicine into mainstream public health services. The policy was developed after the realisation that although conventional systems provide health care to many Kenyans, a large percentage of the population relies on traditional medicines for their primary health care, due to their accessibility, sustainability and affordability. However, there are weaknesses in the existing policy, regulatory and legislative framework guiding the

use of TMMP. The Cabinet approved the draft policy for public debate in August 2006, with the Minister for Planning and National Development launching the public debates on November 17, 2006 (Secretariat, National Coordinating Agency for Population and Development, 2007).

Education Policy on HIV/AIDS

The government produced an Education Sector Policy on HIV/AIDS in 2004, that led to the approval of the Sessional Paper No. 1 of 2005 on a Policy Framework for Education, Training and Research, the Kenya National Union of Teachers' workplace policy on HIV/AIDS in 2006 and the Teachers Service Commission's workplace policy on HIV/AIDS also in 2006 (UNAIDS, 2007).

Provisions in the Draft Land Policy

Specific provisions within the Draft Land Policy that was published in 2007 are aimed at protecting the rights of vulnerable groups including those infected with HIV, orphans, widows and women in both customary and statutory marriages.

The policy recommends that in the case of private land, the power of the primary rights holder to alienate the land should be regulated by law in order to ensure that such alienation takes into account all the other legitimate rights or interests (including family rights or interests) held or claimed by other persons over the affected land. In particular, the law should impose an obligation on the primary rights holder to obtain the written and informed consent of all secondary rights holders before exercising the power to alienate. Furthermore, in the case of community land, the law should prohibit the sale to non-members of the affected community but allow sale and exchanges between members (National Land Secretariat, 2005).

16.3 International Level Policies

At the international level, there have been several initiatives to include issues with regard to HIV/AIDS and how it affects conservation and natural resource management and use.

IUCN Motion on Linkages between HIV/AIDS and NRM

At the IUCN World Conservation Congress in Bangkok in 2004, several organizations introduced a motion on the need to acknowledge the linkages between HIV/AIDS and natural resources. The motion was introduced by the African Wildlife Foundation (AWF), Wildlife and Environmental Society of Malawi, The Wildlife Conservation Society, USA and the Ezemvelo KZN Wildlife, South Africa. This motion was passed and now forms part of the official IUCN policy (AWF et al. 2004).

FAO Forestry Policy on HIV/AIDS

The Forestry Department of the Food and Agriculture Organization of the United Nations (FAO) has actively sought to develop policies and a strategic framework to support the role of forestry departments in reducing rural vulnerability to HIV infection and strengthening livelihood responses to AIDS. A series of policy briefs and extension materials have been produced for forest and agro-forestry extension workers. Consultation is being provided in the development of national forest programmes, agro-forestry responses, and work is underway to incorporate HIV/AIDS vulnerability indicators and mapping into national forest assessments (Barany, M. et al., 2005).

17. Conclusion and Recommendations

Torell (2006) summarizes the effect of HIV/AIDS on biodiversity in three categories—accelerated rate of resources extraction, decreased availability of labour and management capacity, and loss of indigenous knowledge on resource management and biodiversity conservation. Recognition that the environment also influences transmission and progression of HIV disease has also been made. In addition, several initiatives have been implementing programmes aimed at gaining a better understanding of these linkages, as well as addressing specific issues of concern. From the foregoing, the following recommendations can be made:

Interventions around the Use of Herbal Medicines

There is need to act proactively to increase the benefits of herbal medication in reducing the adverse effects in HIV. Due to the increasing demand for herbals, it is important for programmes to be initiated to promote the farming of commonly used herbs so as to stem the current depletion of wild herbs. Furthermore, the sale of medicinal plants should be regulated and standardized.

Herbs are playing an important role in HIV care. To reduce their misuse, clear messages on their interaction with ARVs need to be developed and passed on to PLHIV and their care-givers. It is important to sensitize herbalists on the impacts of their trade and also on the role of conventional medicines. Similarly, those using conventional medicines need to understand the role played by herbal medicines.

Safe Disposal of Contaminated Materials

It is important that the relevant government agencies develop guidelines and ensure their implementation on the safe disposal of HIV contaminated materials, such as condoms, syringes and home-based care kits.

Support for HIV and Conservation

Conservation and development organizations should establish and strengthen their programmes by incorporating considerations of HIV prevention, management and mitigation. Therefore, conservation efforts should seek to understand the impacts of HIV/AIDS on the environment, and vice versa, so as to ensure that their programmes take appropriate measures to ensure effectiveness in conservation and improving people's livelihoods.

Support for Supportive Policies

Greater awareness about the linkages between HIV/AIDS and natural resource management should lead to policies that are supportive and that result in the appropriate allocation of resources. Both "stand alone" policies on HIV as well as the mainstreaming of HIV and NRM considerations into the policies of all sectors are needed to address the complex, interlinked issues.

The strategies that should be used to address the issues around the linkages between HIV and the environment are outlined below.

Need for a Multi-Sectoral Approach

Due to the magnitude of the issue of HIV/AIDS, especially when viewed within the context of poverty, environmental degradation and climate change, it is important that a multi-sectoral approach to the issues be adopted.

Sharing of Knowledge and Information

Through sharing of knowledge and information, between conservation organizations and those dealing directly with HIV/AIDS, the issues can be tackled in a more effective manner.

Gaining Insights from Communities

It is important to gain insights from existing initiatives, especially those that have organically emerged from within communities, on how to cope with HIV/AIDS.

Up-Scaling and Replicating Successful Initiatives

There are initiatives that provide best practices that should be analyzed and up-scaled, with the relevant modifications to make them culturally and contextually relevant. The experiences of countries and communities that have successfully reversed the rate of HIV/AIDS infection and improved on its management should provide valuable lessons.

Use of Existing Tools

Some organizations have produced tools and guidelines on different aspects of managing HIV/AIDS and issues arising from its linkages with natural resources. Collating the existing resources and modifying them to suit different contexts will speed up the rate at which initiatives are effectively implemented.

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Annex I:**Organizations Visited**

NAKURU
Love and Hope Centre
International Community for Relief of Starvation and Suffering
District AIDS Coordinator (DASCO)
Urban Harvest of the Collaborative Group on International Agriculture Research (CGIAR)
Tumaini na Fathili
Herbalist Edward
Herbalist Isaac
KISUMU
Safe Water and AIDS Project
Kisumu Urban Apostolate Program
Swedish Cooperative Centre VI-Agro Chemistry (SCC VI)
Thong Sodu Women's Group
Dunga Fishing Community
Herbalist Alice Awino
THIKA
Hope and Love Support Group
Kamirithu Herbal Clinic
Speak and Act CBO
Thika FHOK Support Group
DeI Monte Industries (Declined to give information)
NAIROBI
National Environment Management Authority (NEMA)
National AIDS Control Council
ELDAMA RAVINE
Nuru Support Group
District Public Health Officer
Eldama Ravine Town Council
District Social Development Office
District Youth Office
Herbalist Baraka
Sustainable Development Forum (a CBO)
Bishop Kigen Children's Home
Ravine Roses

Annex II:**Medicinal Plants Used by Communities Living around Lembus Forests**

	Botanical Name	Local Name	Medicinal Function
1	<i>Acacia abyssinica</i>	Sertuet	Stomach-ache
2	<i>Acokanthera schimperi</i>	Keliot	Stomach-ache
3	<i>Albizia gummiferi</i>	See	Broad spectrum for treating infants
4	<i>Azadirachta indica</i>	Mwarbaini	Treating malaria typhoid among others
5	<i>Cadaba farinose</i>	Birirwet	- Leaves for treating coughs, ulcers, gonorrhoea, dysentery, - Ash for general body pains, - Shoots for treating stomach-ache
6	<i>Carrisa edulis</i>	Legetetwet	Roots for treating stomach & heart problems
7	<i>Combretum molle</i>	Kemilet	Roots for treating snake bites, stomach pains, fever, dysentery and leprosy.
8	<i>Cordia abyssinica</i>	Samute	Bark used to treat rashes.
9	<i>Croton macrostachycus</i>	Tebessuet	Leaves for treating rashes and bark and roots for treating malaria
10	<i>Dodonaea anggutifolia</i>	Tabilikuet	Leaves for treating rashes
11	<i>Ekerbergia capensis</i>	Kipchekwere or Temwe	Roots for treating coughs
12	<i>Erythrina abyssinica</i>	Kagaruet	Bark for treating stomach ache and dysentery and Gonorrhoea
13	<i>Faurea saligna</i>	Musumboriet	Bark for treating pancreas and purifies blood.
14	<i>Warmbugia ugandensis</i>	Soget	Leaves for treating rashes/allergy and chest pains - Leaves used in curries and chilli souts (roots)
15	<i>Olea Africana</i>	Yemit	Roots treatment of headache
16	<i>Ozoroa insignis</i>	Menwet	Roots for treating tooth-aches
17	<i>Prunus Africana</i>	Tenduet	Roots for treating blockage of urine
18	<i>Schinus molle</i>	Pepper tree	Leaves for treating coughs
19	<i>Syzygium guineensis</i>	Lamaiywet	Fruits for treating ulcers and general nutrition
20	<i>Teclea nobilis</i>	Kurionde	Roots for treating coughs and fever
21	<i>Osiris langulata</i>	Mormorwet or Chopiniot	- Treating typhoid and diarrhoea - Mixed with other herbs for treatment of syphilis

Source: Kimokiy K. (2007)