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World Bank Discussion Papers

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Its Implications for Development

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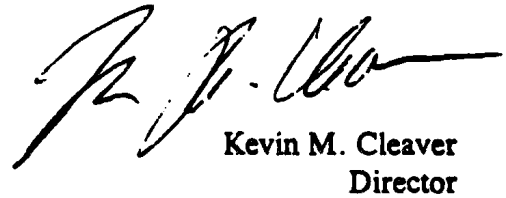
FOREWORD

In 1988 the Africa Region of the World Bank adopted an agenda for action on the Acquired Immunodeficiency Syndrome (AIDS) epidemic in Africa. By 1990 it was increasingly apparent in countries hardest hit by AIDS the epidemic was not solely a health sector issue. Consequently, this study was undertaken to begin to explore the economic and social channels through which AIDS would likely have an impact on Uganda's development prospects. The report was updated and revised in 1993 to incorporate the 1991 Population Census results.

This study postulates that AIDS will have far-reaching impact on the social and economic fabric of Ugandan society and poses a serious threat to Uganda's development agenda. Because of this, the study recommends that key policymakers outside ministries of health—such as finance and planning—must factor in the consequences of AIDS when considering development strategies. The study also draws attention to the increasingly evident trend that HIV is spreading rapidly into rural areas, which has implications for agricultural sector strategy.

Developments since this study was completed reflect the thrust of its recommendations. In Uganda, a Ugandan AIDS Commission was set up in 1991 to facilitate and coordinate AIDS activities from a multisectoral perspective. Operationally, an IDA credit for US$50 million was approved in April 1994 to support a project that focuses on preventing transmission of HIV and other sexually transmitted diseases, mitigating the personal and social costs of AIDS and supporting institutional development to manage HIV prevention and AIDS care. Finally, this and other studies led in 1992 to a revised agenda for the Africa Region to address the AIDS epidemic. The revised agenda called for World Bank assistance to countries in preparing additional country-specific multisectoral AIDS strategies to prevent further HIV infection and to mitigate the social and economic consequences. It also highlighted the significance of HIV as a sexually transmitted disease.

This paper recommends that much more study on the nature and magnitude of the epidemic is needed in order to better anticipate its consequences. More information about the complex interrelationship between AIDS and economic activity is also needed to better understand the epidemic's impact and to better inform policy decisions. Addressing such research needs is the focus of recently initiated studies sponsored by the Africa Region of the World Bank and governments in over 15 Sub-Saharan countries.



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ABSTRACT

Uganda was one of the first African countries to confront the seriousness of the HIV/AIDS epidemic. AIDS is not solely a health problem, nor can it be dealt with as such. This paper traces the social and economic channels through which the AIDS epidemic is likely to make its impact on Uganda's development prospects. In particular, it examines the impact on health expenditures, given projections of essential drugs that would be needed to treat persons with AIDS. It also looks at the impact of the epidemic on agricultural production from both a household and farming system perspective. Finally, the study explores the ramifications on the labor force. Recommendations and areas for further research conclude the study.

ACKNOWLEDGEMENTS

This report was prepared by Jill Armstrong, based on the findings of a mission that visited Uganda in December 1990. The mission consisted of Jill Armstrong, mission leader, AF2PH; Eduard Bos, PHRHN; Kerry Selvester, AFTFS and Save the Children Fund; Anthony Burton, WHO/GPA; Ramona Lunt and Gerry Hewitt, consultants. The report was revised and updated in November 1993 to incorporate the findings of the 1991 Population Census into the epidemiological and demographic model. Comments on earlier versions of the report were provided by Bank staff Messrs/Mmes. Ainsworth, Bannon, Baudouy, Burnett, Coates, Gebhart, Hecht, A. Hill, Jagdish, M. Lewis, Mahar, Miovic, Meesook, Over, Swamy, and Videus. External comments were received from Dr. Elizabeth Madraa, Manager, National AIDS/STD Control Programme, Ministry of Health, Uganda; Dr. Abiola Tilley-Gyado, Coordinator, National AIDS/STD Control Programme, Federal Ministry of Health and Social Services, Nigeria; Ms. Logan Brenzal, Health Economist, and Dr. Seth Berkley, Assistant Health Director for Health Science, Rockefeller Foundation. Financial support and comments were also received from WHO/GPA.

GLOSSARY OF TERMS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome, characterized by unusual opportunistic infections in otherwise healthy individuals resulting from a compromised immune system.
ACP	AIDS Control Programme, Ministry of Health.
Asymptomatic	Phase during which an individual is infected with the virus, which eventually causes AIDS, but has not yet shown major symptoms of AIDS.
CBR	Crude Birth Rate, the number of births per 1,000 population in one year.
CDR	Crude Death Rate, the number of deaths per 1,000 population in one year.
CMR	Child Mortality Rate, the probability of dying between ages one and five aged under 15 and over 64 ("dependent population") divided by the population aged 15 to 64 ("productive population").
GIS	Geographic Information System.
GPA	WHO's Global Programme on AIDS.
HIV	Human Immunodeficiency Virus, a retrovirus that damages the human immune system, which then permits opportunistic infections to cause eventually fatal diseases. The causal agent for AIDS.
IMR	Infant Mortality Rate, the number of deaths to infants (children under age one) in a given year per 1,000 live births in the same year.
Incidence	An epidemiological term that refers to the number of new cases of a disease occurring in a population during a given period of time, usually a year.
Life Expectancy	The number of years from birth that an individual on average can expect to live.
MOH	Ministry of Health.
Opportunistic Infections	The many parasitic, bacterial, viral, and fungal infections that are able to cause disease once the immune system has been damaged. These are the most common clinical manifestations that establish the diagnosis of AIDS. They are characterized by an aggressive clinical course, resist therapy and have a high rate of relapse.

Orphan	In Uganda an orphan is defined as any child under the age of 18 who has lost one or both parents.
Prevalence	An epidemiological term that refers to the number of persons with a given condition at a point in time.
Prevalence Rate	Proportion of a specified population that exhibits a disease at a specific point in time (often expressed per 1,000).
Serological	Of or pertaining to blood. In the context of HIV/AIDS, blood tests are performed to determine whether an individual is carrying either the virus or has antibodies to the virus.
STDs	Sexually Transmitted Diseases.
TB	Tuberculosis.
TFR	Total Fertility Rate, defined as the average number of children that would be born alive to a woman during her lifetime given current age-specific fertility rates.
UAC	The Ugandan AIDS Commission, established in 1992 as the multisectoral agency responsible for policy and coordination of the multisectoral AIDS program.
WHO	World Health Organization.

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EXECUTIVE SUMMARY

UGANDA: The Economic Impact of AIDS

The AIDS epidemic has dominated the attention of the international medical community for just over a decade. The disease spread quickly, beginning in Eastern Africa. In 1993, an estimated 15 percent of Uganda's adult population —1.3 million of almost seventeen million people—is infected with the human immunodeficiency virus (HIV), the causative agent for AIDS. To many, AIDS is a problem that affects an individual's health status and poses additional strains on national health care systems. But as Uganda and other countries have realized all too quickly, AIDS is not solely a health issue and cannot be dealt with as such. Rather, the epidemic will have far-reaching impacts on the economic and social fabric of Ugandan society. This study begins to explore the channels through which AIDS will not only affect the health and longevity of the population but might affect key sectors of the economy, growth prospects, and the attainment of national development objectives.

The effects of AIDS in Uganda will be felt on many fronts—human, economic, and social. First and foremost, *human resource development* is already being threatened. As the virus affects the health status of adults and children, important gains in quality of life indices (such as life expectancy and infant mortality) are being reversed. The gains of the child survival revolution have already been reversed. Scarce resources available in the health sector are diverted from preventable and curable ailments to treat AIDS patients. Implications for massive resurgence of tuberculosis will threaten further the health status of Ugandans. Investments in education and the accumulation of precious human capital are also compromised. Not only is the current stock of the educated elite being reduced, but the future quality and quantity are likely to be reduced, both because teachers are among the age groups most highly infected and because affected families will have reduced financial resources to pay for school fees. The AIDS epidemic will have *adverse economic implications* for Uganda, not merely because of its magnitude, but more important because, unlike other illnesses, it selectively affects adults in their most sexually active ages, which coincide with their prime productive years. The main channel through which the epidemic will affect the Ugandan economy is the size and quality of the labor force. Because AIDS has a long laten. period (up to ten years), the serious longer-term macroeconomic implications will be gradually revealed. Finally, although many of the *social consequences* cannot be measured, large-scale disruption of family and social structures, stigmatization, mourning, and grieving also constitute significant social costs. One of the most visible and immediate impacts of AIDS is the rapidly growing number of orphans, in 1993 estimated at three-quarters of a million children.

Concerning the magnitude of the epidemic and its demographic impact, the study found that:

- HIV prevalence in Uganda increased from about 9 percent of adults in the late 1980s to about 15 percent by 1993 or 1.3 million adults. By the year 2020, the number of infected adults could range anywhere between 200,000 and 2.8 million depending on the effectiveness of prevention campaigns.

- Although infection rates in rural areas are less than in urban areas, because 90 percent of Ugandans still live in rural areas, the absolute number of people infected there is very high.

- The incidence of new infections between 1989 and 1990 was found in one predominantly rural district (Rakai) to be over 3 percent per year, even in the more remote agricultural villages.

- As of December 1992, about 38,500 cumulative AIDS cases had been reported officially. as in most countries, however, this figure is grossly underreported; a more accurate estimate is approximately 163,000 *cumulative* AIDS cases as of 1993. By 1995 earlier infections will have generated nearly 200,000 *annual* AIDS cases—more than double the number in 1990.

- In 1995 an estimated 110,000 adults and children will die from AIDS. The annual number of AIDS deaths will only peak in 2003. Cumulatively, even under the most optimistic scenario that a vaccine is developed, more than 2 million adults would die of AIDS by 2020; without effective interventions, that figure is nearly double.

- Age distribution of adult AIDS cases shows a high frequency and bunching in the sexually most active years of 15–49, with an overall mean age of 30 for adults with AIDS. On average, men with AIDS are older than women, 32 years compared to 28 years old, implying that women are infected earlier.

- Not only are women infected earlier (during peak childbearing years), but HIV prevalence levels are higher among women than men. Women are 1.3 times as likely to be infected as men. In 1993 an estimated 15.8 percent of women were infected compared with 13.7 for men. If present infection rates continue, it is projected that, by 2020, 20.6 percent of women will carry the virus after peaking at nearly 23 percent in 2010. The percentage of men infected rises from 13.7 percent in 1993 to 16.5 percent by 2020.

- The fact that more women are infected earlier presents grave implications for perinatal transmission and increased challenges to improving maternal and child health status.

- Under an optimistic scenario, Uganda's population would be nearly 15 percent less by 2020. The effect of AIDS mortality will also reduce population growth by 0.5 to 1.1 percentage points annually through 2020. Nevertheless, population growth will remain high (by more than 2 percent even under the most pessimistic scenario) and, even with AIDS, Uganda's population size will double between 1993 and 2020.

- The AIDS epidemic has caused a deterioration in many recent gains in standard quality-of-life indices. In the absence of AIDS, the crude death rate (CDR) is projected to decline almost linearly to 11 per thousand by 2020. With AIDS, the CDR rises above late 1980s levels and, only under an optimistic scenario, will it drop back to the late 1980s "no AIDS" level after the year 2010. Without AIDS, mortality in children under five would have dropped from 182 per thousand in 1990 to about 117 per thousand by 2020. With AIDS, child mortality rates can be expected to be between 150 to 170 percent higher through 2020.

- If no AIDS were present, life expectancy at birth would have been projected to increase from about 49 years (male and female combined) in 1993 to about 55.5 years in twenty years. Instead, AIDS mortality has already brought an eight-year decline in life expectancy at birth.

- Although AIDS mortality is often expected to change significantly the dependency ratio, in fact, it is affected only slightly because of the offsetting effects of pediatric and adult AIDS deaths.

In terms of impact on the health sector, the study finds the following:

- The emergence of AIDS has significantly altered the disease pattern in Uganda. Hospital records in 1990 indicated that AIDS was the second leading cause of inpatient deaths after malaria; two years earlier, AIDS ranked only sixth.

- In major urban hospitals, approximately 70 percent of patients in medical wards and an even higher percentage in tuberculosis wards are HIV-positive.

- The impact of HIV/AIDS on the health sector will be reflected by a significant increase in the demand for health care and further stretch already constrained inputs such as hospital beds, laboratory services, drugs, and skilled personnel.

- The epidemic will also require increased health care expenditures, including for essential drugs needed to treat the large number of illnesses that an AIDS patient is likely to encounter.

- On average, the lifetime cost of drugs required per adult AIDS case was estimated at $13.80[1] (in 1990 prices) compared to about $3.00 per capita, which the public sector actually spent for all health care (including drugs) in the same year.

- Given limited government and household budgets, the cost of essential drugs required for treating the opportunistic infections of terminal AIDS patients is compared with the cost of treating other curable illnesses. A treatment course for malaria—the leading cause of death in major hospitals—using chloroquine would cost on average less than 20 cents; the cost of vaccines to immunize a child fully against the main childhood diseases would cost just under $2. Assuming that only 35 percent of AIDS patients ever seek treatment, the value of those drugs used by them could have bought vaccines to immunize one-third of infants or 2.5 million cases of malaria.

- In aggregate terms, it was estimated that in 1991 an incremental $1.4 million would have been spent if all AIDS patients sought medical care and the drug was 100 percent available. This would be equivalent to 15 percent of Uganda's public sector expenditures for all drugs. By 1995, the cost of treating all AIDS patients could escalate to almost $2.3 million (in 1990 prices), consuming as much as 23 percent of a constant public sector drug budget.

The study's preliminary findings indicate that the AIDS epidemic will have adverse implications for the Ugandan economy. More specifically:

- The impact of AIDS on the economy will be felt through its effect on two key inputs into economic activity—labor and capital. The most immediate impact will be through changes in both the productivity and size of the labor force.

- AIDS is significantly different from other fatal illnesses because it selectively affects adults in their most sexually active ages, which coincide with their prime productive years.

- By causing premature mortality to a significant number of workers between the ages of 15 and 60, AIDS will reduce both the size and growth of the labor force. By the year 2010, there will be about 2 million fewer in the labor force age group or approximately 12 percent less than without AIDS.

[1] Unless otherwise indicated, dollar amounts in this document are given in U.S. currency.

- AIDS will also affect the productivity of the labor force as debilitating and reoccurring episodes of various HIV-related illnesses impair productivity through reduced functional capacity. In the household, other family members (including children) will reallocate some of their time to care for the patient, potentially reducing overall household allocation for productive activities in the home, school, field, or market. In the workplace, other workers may be required to assume responsibilities of ill coworkers. In addition to morbidity, the premature death of persons with AIDS affects productivity by robbing the economy of experienced workers, many of whom are difficult and expensive to replace. The loss of women—who are key to production in both the home (food preparation and child raising) and in agriculture—will be particularly devastating because they are infected at critical ages, that is, when their children are young.

- Three key features of the Ugandan economy and labor market make Uganda particularly vulnerable to the potential effects of the epidemic. First, the bulk of economic activity and production takes place in rural areas. Second, agricultural production is labor-intensive. Third, despite rapid population growth, labor is a relatively scarce factor of production. The increasing spread of HIV infection in rural areas combined with the intensity and relative scarcity of labor in agricultural production suggests that the AIDS epidemic is likely to have a negative impact on both overall production and per capita income.

- In addition, AIDS will have longer-term negative consequences for capital formation, which in turn influences the overall productivity of the labor force and ultimately economic growth. Society's ability to invest in the human capital of their children today and firms' ability to invest in physical capital will both be reduced as expenditures are diverted to meet increased health care and other expenditures related to AIDS.

Turning to specific sectors of the Ugandan economy, the study found that:

- *In agriculture,* the bulk of production is concentrated almost exclusively on smallholder farms and tends to be very labor-intensive. At the farm level, AIDS will affect two key farm production parameters. First, household labor quality and quantity will be reduced, with a high probability that more than one adult per family is infected. Second, AIDS will reduce the availability of disposable cash income used to purchase agricultural inputs, such as occasional extra labor or other complementary inputs (for example, new seeds or plants, fertilizer, pesticides, or oxen power). Family assets might also be depleted.

- The response of a smallholder household faced with these changes will be to first produce enough to cover household subsistence and only then to grow small and varying amounts of marketable surplus. The composition of crops may be gradually altered, shifting back toward subsistence crops, the area under cultivation reduced, and husbandry levels (for example, weeding and pruning) curtailed.

- At the farming system level, the impact of AIDS will be felt more where labor is a already a relatively scarce factor of production and where the duration of the rainy season limits flexibility in phasing peak cropping seasons to minimize the bunching of labor demand. Some areas where HIV prevalence is particularly high and where labor is relatively scarce coincide with farming systems where traditional labor-intensive exports crops (such as coffee and cotton) are presently grown.

- Labor costs can be expected to increase, reflected in both market wage rates and the shadow wage rate implicit in family farm operations. This, in turn, could lead to a reversal in migration from urban areas or increased migration from other regions with surplus labor.

- At an aggregate level, the composition of agricultural output is likely to change reflecting farm households' response to labor shortages by altering cropping patterns, most likely in favor of less labor-intensive staple crops. This could undermine the government's strategy for fostering agricultural growth by shifting away from food production for domestic markets toward production of raw materials for processing and/or direct export and for increasing production of traditional export crops.

- AIDS will also restrict the capacity of smallholder farmers to respond to producer incentives in the agricultural sector. The ability to take advantage of the recommendations of agricultural extension services may also be impaired, as AIDS families will have less cash available for the purchase of improved seeds and/or fertilizer. At one extreme, some AIDS-fragmented families may virtually withdraw into subsistence food production, while others, such as female-headed households, may lack access to rural credit or agricultural extension services.

- Food security and nutrition will also be affected by AIDS. Farming systems that are already unable to provide sufficient protein and/or energy requirements are susceptible to increased malnutrition. The disruption of the family as an economic unit due to AIDS in turn undermines household food security. Such households face reduced levels of productive capacity, purchasing power, and food availability per household member.

- In the *formal sector,* AIDS threatens the expansion of industry and the private sector, which is critically reliant on skilled workers, entrepreneurs, and managers. Firms are facing increased turnover of experienced workers because of increased mortality attributable to AIDS.

- Profits are negatively affected due to reduced productivity of infected workers and to increased costs of employee health care benefits, funeral costs, and recruitment and retraining of lost workers.

Based on the portrayal of the epidemic in the Ugandan setting, the study suggests the additional following measures to enhance both prevention of new infection and to mitigate the economic consequences:

- The design of any AIDS prevention program needs to be based on the high payoffs of the synergistic effects of behavior change—including not only a reduction in the number of sexual partners but also increased condom use—coupled with an effective STD treatment and control program.

- Because women are increasingly disproportionately infected and are transmitting the virus to their infants, programs for maternal and child health cannot ignore AIDS.

- Average drug costs for AIDS are sensitive to the choice of treatment regimen. Treatment protocols for individual opportunistic infections should be reviewed in terms of the cost-effectiveness of existing and alternative interventions, particularly tuberculosis, which, although expensive to treat, has significant positive externalities.

- Pharmaceuticals must be efficiently and effectively utilized. Standard treatment guidelines should be revised based on cost-effectiveness considerations and widely distributed to health personnel. An educational campaign on the rational prescription and use of drugs contained in the guidelines should be considered.

- For farming systems for which AIDS will have significant negative consequences because of labor scarcity, agricultural research should explore labor-saving technology and hybrid varieties that require

less fertilizer or pesticide. Disseminating such research (as well as existing knowledge) through extension services should be broadened to include women. Extending credit to smallholder farmers, in particular to women and other vulnerable households, should also be considered.

- Severely affected households will need special targeted assistance to ensure food security. Orphan households, for example, with limited or no extended family support could benefit from not only emergency relief but from technical training and basic implements.

- In the formal sector, firms can begin by monitoring the impact of the epidemic in terms of increased costs and by considering explicit company policy on HIV/AIDS. The formal workplace should also serve as an important venue to help prevent the further spread of HIV (for example, through the dissemination of educational messages).

Because the study only scratches the surface of the complex interrelationship between AIDS and economic activity, more in-depth investigation is recommended in particular areas to better inform policy decisions. These include:

- To predict the potential demographic and economic impact more accurately and to refine appropriate programs and policies further, more certainty is needed on the epidemiological parameters (and their interactions) used to model the spread of the epidemic.

- Although the impact of HIV/AIDS on the health sector extends beyond drugs (for example, health personnel, hospital beds, and laboratory facilities), major information gaps exist about its magnitude. Moreover, families and communities also face increased challenges in caring for AIDS patients. More information is needed on the costs and benefits of alternative strategies for caring for AIDS patients (for example, home-, community-, and facility-based care).

- It has been argued that the AIDS epidemic in Uganda will have negative consequences for economic growth prospects; however, the impact has yet to be quantified. Macroeconomic modeling, including in particular the adjustment of labor and capital parameters, can provide an order of magnitude for the impact on output and per capita income.

- In agriculture, the magnitude of the impact that AIDS will have on farming systems and aggregate agricultural output will depend on variables such as migration and wage levels as well as coping mechanisms adopted by individual production units. More information is needed on the effects of AIDS on the rural labor market (which should be monitored especially for the effects of migration and the division of labor along gender lines) and on microeconomic-level production decisions.

Among the countries in Sub-Saharan Africa, Uganda has been one of the most forthright in admitting the seriousness of its AIDS problem. It has also been one of the first to take concrete steps to confront the issue. The growing realization that the AIDS epidemic is a multisectoral issue prompted the Government of Uganda to establish the National AIDS Commission. The mandate of the commission is to facilitate and encourage the involvement of as many actors as possible to both prevent the further spread of AIDS and to mitigate its consequences.

Finally, in light of the far-reaching implications of AIDS in sectors beyond health, the study recommends that international aid agencies and bilateral donors acknowledge these potential ramifications when considering development strategies and project design.