

THE ECONOMIC DETERMINANTS OF THE HIV/AIDS EPIDEMIC IN AFRICA

The HIV/AIDS epidemic has exacted a terrible toll in Sub-Saharan Africa. In 2012, according to the AVERT website, a total of 25 million people in 21 countries of Sub-Saharan Africa were living with the disease; in the same countries, 1.6 million new infections and 1.2 million HIV/AIDS-related deaths were recorded in 2012 alone. The

economic determinants of this situation have for a long while been neglected, but a recent study¹ fills this gap and gives a new perspective on the high prevalence of the disease in the region.

The authors test for and find positive evidence of a relationship between negative rainfall shocks and HIV/AIDS infections. In Africa, where a majority of the population draws its subsistence from agricultural activity, variation in climate conditions like rainfall significantly affects individual

incomes (this has been confirmed by many economic studies). The authors hypothesize that shortfalls in individual incomes lead to modification in sexual behavior, i.e. adoption of more risky behavior and transactional sex in particular, and adoption of more risky

[This study] brings a new explanation for the high prevalence of [HIV/AIDS] in the African continent

sexual behavior implies a higher transmission of the disease. Why does variation in individual

income lead to more risky sexual behavior? There are at least three explanations of this effect: it leads to temporary migration, which often implies new sexual partnerships; parents withdraw children from school in times of negative income shock and children who drop out from school are more prone to sexual activity and earlier marriage; or negative income shocks lead people and women in particular to engagement in transactional sex.

AGRODEP is a Modeling Consortium of African researchers living and working in Africa with research interests ranging from economic modeling to regional integration and development to climate change, gender, poverty, and inequality.

There are currently 141 members from 27 countries; our members work at top research institutions and universities in their own countries as well as various government agencies and non-profit organizations.

The **benefits of being an AGRODEP member** include opportunities for research grants, free access to cutting-edge economic research tools, data, and training. Members also gain access and exposure to large global networks of economic researchers and experts.

[Learn more.](#)

¹ Burke, M., Gong, E. and K. Jones, 2014, Income Shocks and

HIV in Africa, *The Economic Journal*, DOI: 10.1111/eoj.12149.

The great value of this study is its use of high-quality data to econometrically test this hypothesis: on the health side, individual-level data taken from twenty-one demographic and health surveys (DHS) conducted in nineteen different sub-Saharan countries; and on the rainfall shocks side, weather data derived from the University of Delaware database, which gives monthly temperature and precipitation information on a 0.5x0.5 degree gridded data set over land areas from 1900 to 2008. Precipitation data are particularly interesting since they have a very significant effect on agricultural yields and therefore on individual incomes. Additionally, precipitation is independent from other factors that explain the transmission of the disease. Moreover, the time dimension of the data is capable of capturing the potential disjoint between the time when an individual is infected and the time he is revealed as HIV/AIDS infected in the DHS.

In their study, the authors match each DHS cluster to the weather grid cell. They define a shock as a crop-year rainfall below the 15 percent quantile of the local rainfall distribution. This is important to consider that shocks are defined as *relative to the location's own long term rainfall distribution*: if shocks

were defined in an absolute sense across all locations, locations with higher variance in general would appear to have had more shocks.

The authors find that the relation between negative rainfall shocks and HIV/AIDS infections is significant: a negative rainfall shock implies a 0.3 percentage point augmentation in HIV prevalence from 4.1 percent to 4.4 percent. Not only is this effect significantly different from zero, but it is high. At the macroeconomic level, countries with more negative rainfall shocks have a higher HIV prevalence, with this effect explaining between 14 to 21 percent of the total variation across countries. The authors have conducted many robustness tests that largely confirm these results.

As was expected, the presence of the effect is much stronger in high-prevalence countries like Swaziland, Lesotho and Zambia, and it is not significant in low-prevalence countries like Senegal or Mali. Also as expected, the relationship is not significant in urban areas but it is highly significant and stronger in rural areas, simply because rainfall shocks are a better proxy for income shocks in these areas. Concerning gender, the difference is not significant: the impact of negative income

shocks on HIV transmission on females and males may be considered as identical.

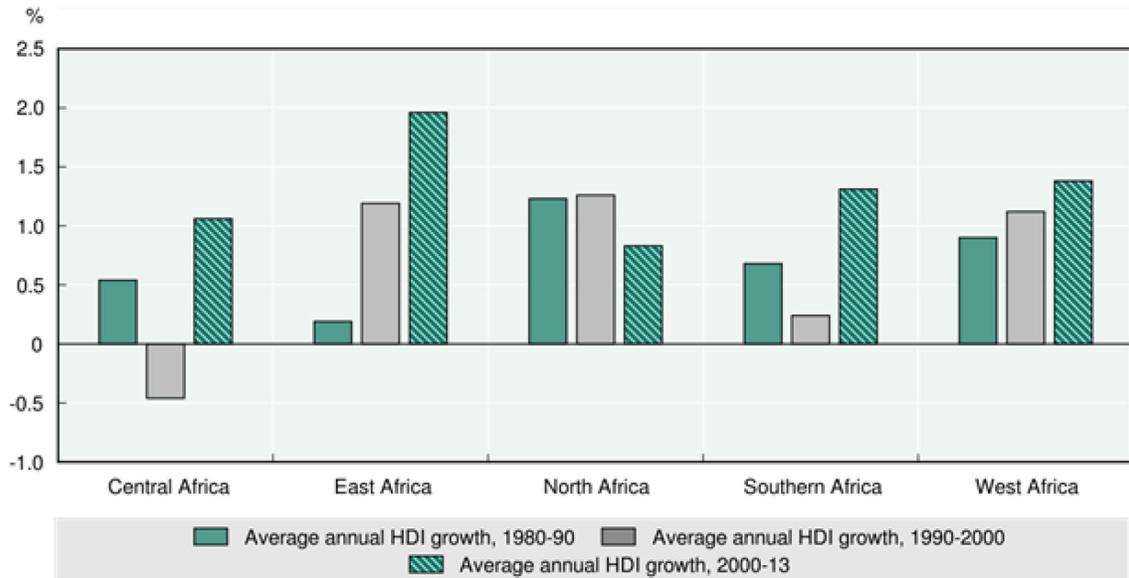
What is the pathway from economic shock to infection? The authors are not able to really identify this pathway due to a lack of detailed individual data. Nevertheless, they can conclude from the data that temporary migration, children withdrawn from schools for earlier marriage, nutrition or civil wars are not the culprits. Shortfalls in individual incomes related to precipitation leading to increased transactional sex is the remaining suspect, inviting further research to map out the exact path from start to finish.

The study is very convincing, fascinating even. It brings a new explanation for the high prevalence of this terrible disease in the African continent. It also has substantial policy implications by underlining the importance of implementing effective mechanisms in these countries to cope with income variations. Weather-indexed insurance, access to credit, development of drought-resistant crops, comprehensive safety nets - these mechanisms receive here a new and strong justification.

*Antoine Bouet, Senior
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DATA

Recent statistics about Africa

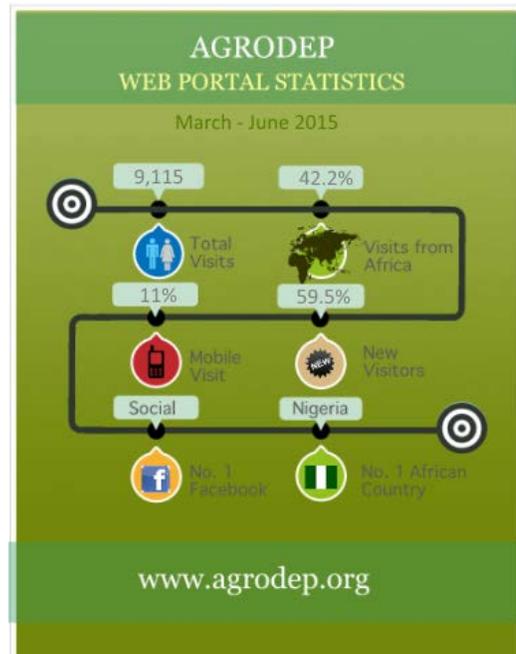


SOURCE: AFRICAN ECONOMIC OUTLOOK, 2015

This figure is drawn from the 2015 African Economic Outlook, released on May 2015. It shows the evolution of the Human Development Index (HDI) from 1980 until 2013 in Africa by region. The HDI ranks countries in terms of human development, based on a composite index combining life expectancy, education, and per capita income. The long term economic transformation of Africa implies an improvement in human development, particularly since 2000, in all African regions except North Africa.

NEW AGRODEP WORKING PAPER

The latest addition to the **Working Paper** series, "Analysis of Impact of Climate Change on Growth and Yield of Yam and Cassava and Adaptation Strategies by Farmers in Southern Nigeria," written by AGRODEP member **Nnaemeka Chukwuone**, examines adaptation and decision making of farmers in Nigeria as they experience changes in crop production due to climate change. Climatic changes have been noticed by the majority of study respondents, particularly with regard to production losses, price increases, and food shortages. Farmers with higher levels of education were more likely to adapt non-farming activities to mitigate negative effects of a changing climate, as well as farmers in male-headed households and households that were larger in size.



AFFILIATE MEMBERSHIP

Fourteen new **Affiliate members** were accepted by AGRODEP in early May 2015. Affiliate Membership is open to AGRODEP members who have temporarily or permanently moved out of Africa, to other African researchers who live and work outside Africa, and to African and non-African researcher who work in international and CG centers in Africa. **Applications for membership** are accepted throughout the year. Affiliate members gain access to AGRODEP resources (data, models, publications) and are eligible to participate in AGRODEP activities, including training courses, under their own funding.

RESEARCH VALORIZATION GRANTS

AGRODEP members attending international conferences



AGRODEP routinely provides grants and awards to members, and a portion of that funding is reserved for members to attend international conferences. Under the **Research Valorization** program, AGRODEP provides up to \$2500 per year per member to travel and present their work at a research conference. In addition, this grant can be used to fund journal submission fees. Through the first half of 2015, **6 AGRODEP members have been awarded grants** to travel to several conferences, including the **60th World**

Statistical Conference in Rio de Janeiro, the **41st Eastern Economic Association Conference** in New York, and the **18th Annual Conference on Global Economic Analysis** in Melbourne.

Most recently, **Christian Tipoy** had a successful trip to Boston for the 2015 **International Journal of Arts & Sciences' International Conference for Business and Economics** where he presented the paper, "Real Convergence Using Tar Panel Unit Root Tests: An Application To Southern African Development Community."

AWARD FOR EXCELLENCE IN PUBLICATION

AGRODEP members who publish in outstanding journals are encouraged to apply for the **Excellence in Publication Award**. Awards range from US\$250 to US\$3000 depending on the ranking of the journal where the paper is published. To apply for the award, members must have had their papers published in 2015 and must actively participate in AGRODEP activities.

One AGRODEP member has received the award in 2015. Congratulations to the most recent recipient, **Isaac Oluwatayo**, who received an award for his publication in the *Austrian Journal of Forest Science*.

WHAT IS AGRODEP?

The African Growth and Development Policy (AGRODEP) Modeling Consortium is an initiative led by the International Food Policy Research Institute (IFPRI). The goal of AGRODEP is to position African experts to take a leading role in both (1) the study of strategic development questions facing African countries as a group and (2) the broader agricultural growth and policy debate, which traditionally has been dominated by external actors and concerns.

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