**Broadband Internet for Africa**

IMAGINE A MAJOR RESEARCH UNIVERSITY WITH TENS OF THOUSANDS OF STUDENTS TRYING to access the Internet through a single U.S. household connection. That is the present situation in most African universities. Students there theoretically have access to *Science* through several journal archives for the developing world. In practice, most could never download it.

Sub-Saharan Africa is the most digitally isolated region in the world, with a bandwidth per capita that is only 1% of the world average and 0.2% of that in the United States. Not surprisingly, sub-Saharan Africa also has among the highest connectivity costs in the world. Its universities pay some 50 times more for bandwidth than do similar institutions in the United States, and connectivity cost per gross domestic product is almost 2000 times higher than in the United States. The resulting isolation of Africa’s students from the remainder of the world is a serious impediment to both education and economic development.

The challenges the continent faces—meeting human needs, participating in the global economy, managing the environment, and improving governance, all outlined in the 2007 report *Freedom to Innovate*, commissioned by African presidents—require engineers, doctors, scientists, and businesspeople, all products of Africa’s universities. For years, strategies to address these challenges centered on providing direct assistance for combating disease and poverty and for providing food and water. But living conditions in Africa cannot be improved without sustained long-term economic growth. That goal in turn requires connecting Africa to the rest of the world. The 3 million college students in sub-Saharan Africa need the same resources and access to knowledge as students anywhere. Next month, when the G8 summit opens in Japan, this aspect of African development should be a priority.

Africa’s isolation is the result of both lack of infrastructure and lack of competition in telecommunications. West Africa is connected to the rest of the world through a single fiber-optic cable (SAT-3/WASC), which runs along the coast. The country of Senegal, home of one of Africa’s foremost universities, has a total available fiber bandwidth of 1.2 gigabits per second, one-tenth that of Harvard University or the University of Chicago, and that capacity is further shared with four neighboring countries. East Africa is completely unconnected other than by expensive satellite links. Costs are further driven up by national telecommunications companies with monopoly (or at best duopoly) licenses on the sale of bandwidth, who are often content with “high-cost, low-volume” business strategies.

In recent years, African governments are realizing that connectivity is important for economic development, Internet use by African consumers is growing explosively, and industry is recognizing potential markets. The result is a boom in the construction of national fiber networks and proposals for new international submarine cables for East and South Africa. Nascent movements against anticompetitive practices have also helped bring down prices. But inefficient regulatory environments, lack of coherent regional infrastructure policies, and political interference have slowed progress. Efforts to bring affordable connectivity to Africa in general, and to its universities in particular, should be supported by the international policy community.

First, low-cost university access should be secured by making subsidized rates for universities a condition of any license granted to new cable operators. Although West Africa may be limited by the bottleneck of SAT-3/WASC, a new glut of capacity in East Africa, if it truly materializes, would allow allotting bandwidth to support university education. The Association of African Universities called for this initiative in 2007.

Second, helping to underwrite the costs of infrastructure should be a central goal of international development cooperation. International support should also come with requirements for open access; that is, bandwidth must be sold at a fair price to all buyers rather than only to consortium members with national monopolies. Next month’s G8 summit should commit itself to making this a reality.*

---

*Calestous Juma and Elisabeth Moyer*  
10.1126/science.1161105

---

*This editorial is based on remarks by C. Juma at the G8 Dialogue organized by the United Nations University in Tokyo, Japan, on 23 May 2008.*
Editor's Summary

Broadband Internet for Africa
Calestous Juma and Elisabeth Moyer (June 6, 2008)
Science 320 (5881), 1261. [doi: 10.1126/science.1161105]

This copy is for your personal, non-commercial use only.

Article Tools  Visit the online version of this article to access the personalization and article tools:
http://science.sciencemag.org/content/320/5881/1261

Permissions  Obtain information about reproducing this article:
http://www.sciencemag.org/about/permissions.dtl