

Higher Education and Economic Development in Africa

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Foreword

Knowledge-based competition within a globalizing economy is prompting a fresh consideration of the role of higher education in development and growth. Previously it was often viewed as an expensive and inefficient public service that largely benefited the wealthy and privileged. Now it is understood to make a necessary contribution, in concert with other factors, to the success of national efforts to boost productivity, competitiveness and economic growth. Viewed from this perspective, higher education ceases to contend with primary and secondary education for policy attention. Instead, it becomes an essential complement to educational efforts at other levels as well as to national initiatives to boost innovation and performance across economic sectors.

The World Bank has acknowledged and incorporated this understanding within its Africa Action Plan for 2006-2008. This Plan highlights several roles for higher education under its strategic objective of building skills for growth and competitiveness. These include the provision of relevant skills to the labor market; a capacity to understand and use global knowledge in science and technology, particularly for agriculture; a capability to assess existing information and generate new understanding through research; and a much closer working relationship with the productive sectors of the economy. The Plan also reaffirms the fundamental importance of expanding primary education, and of linking secondary education to a range of employment options. In short, a more balanced and strategic approach to human capital development is sought in an effort to boost the prospects for economic growth in Africa.

Although much has been learned about the development process over the past five decades, gaps in understanding still remain. One of these concerns the interactions among educational achievement, output performance, and improved national income. This study was commissioned to review what is known about the conceptual underpinnings for higher education's role in development, and to assess empirical evidence that might lead to a better understanding of how these interactions function in practice. The findings suggest that African higher education can assist countries with technological catch-up and thus improve the potential for faster growth. The analysis relies on aggregate data which inevitably obscure specific lessons about the types of investments in tertiary education that make a difference (e.g., science, engineering, technology, etc. versus other subjects). To their credit, the authors have identified an agenda for future work

on key issues (e.g. the balance across levels of education, cost management strategies, curricular reform, disciplinary focus, etc.) that are central to policy development. My hope is that the publication of this study will spur additional work to enrich the ongoing policy debate and assist African countries to develop sound policies in their quest for faster growth, deeper poverty reduction and lasting improvements in the daily lives of their citizens.

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Executive Summary

For several decades, donor institutions have placed great emphasis on primary and, more recently, secondary education in their development assistance to Sub-Saharan Africa. But they have neglected tertiary education as an added means to improve economic growth and mitigate poverty.

This paper challenges beliefs in the international development community that tertiary education has little role in promoting poverty alleviation. It reviews evidence about the impact that tertiary education can have on economic growth and poverty reduction, with a focus on the countries of Sub-Saharan Africa. Enrollment rates for higher education in Sub-Saharan Africa are by far the lowest in the world. Currently, the gross enrollment ratio in the region stands at only 5 per cent.¹

Because of a belief that primary and secondary schooling are more important than tertiary education for poverty reduction, the international development community has encouraged African governments' relative neglect of higher education. For example, from 1985 to 1989, 17 per cent of the World Bank's worldwide education-sector spending was on higher education. But from 1995 to 1999, the proportion allotted to higher education declined to just 7 per cent. Higher education in Africa has suffered from such reductions in spending. Many African countries struggle to maintain even low enrollment levels, and the academic research output in the region is among the world's lowest.

Recent evidence suggests, however, that higher education can produce both public and private benefits. The private benefits for individuals are well established, and include better employment prospects, higher salaries, and a greater ability to save and invest. These benefits may result in better health and improved quality of life.

Public channels, though less well studied, also exist. One possible channel through which higher education can enhance economic development is through technological catch-up. In a knowledge economy, tertiary education can help economies gain ground on more technologically advanced societies, as graduates are likely to be more aware of and better able to use new technologies.

Our analysis supports the idea that expanding tertiary education may promote faster technological catch-up and improve a country's ability to maximize its economic output. This research shows

¹ Based on authors' calculations derived from data available online from UNESCO (www.uis.unesco.org).

that Sub-Saharan Africa's current production level is about 23 per cent below its production possibility frontier. We find that a one-year increase in the tertiary education stock would raise the long-run steady-state level of African GDP per capita due to factor inputs by 12.2%. The growth rate of GDP per capita would rise by about 0.24 percentage points in the first year as a result of convergence to a higher steady state (but assuming no change in the rate of convergence). Augmenting Africa's stock of higher education would also raise African output growth by an added 0.39 percentage points in the first year due to faster technological catch-up, generating a total increase of 0.63 ($=0.24+0.39$) percentage points in the first year. This higher rate of technological catch-up growth, 0.39 percentage points, would be sustained until Africa reaches the worldwide technological, or productivity, frontier. Although these figures may not appear large at first glance, they imply that a one-year increase in tertiary education stock may boost incomes by roughly 3 percent after five years and by 12 percent eventually. Considering that incomes have been falling in some African countries, such growth would be significant. This finding therefore indicates that tertiary education plays a recognizable role in promoting economic growth. Tertiary education may improve technological catch-up and, in doing so, help to maximize Africa's potential to achieve its greatest possible economic growth given current constraints. Investing in tertiary education in Africa may accelerate technological diffusion, which would decrease knowledge gaps and help reduce poverty in the region.

In recent years, organizations such as the World Bank and major donor governments have begun to reconsider their exclusive focus on primary education and are now reaching out to secondary and tertiary education, as the balance between poverty reduction and growth promotion is adjusted within development assistance strategies. There are signs of progress for higher education in Sub-Saharan Africa, and some African countries have put in place innovative policies to strengthen tertiary education systems. But this progress is limited in comparison with the progress of other world regions. This may result from insufficient understanding of the positive effects that higher education can have on economic development. The findings of this paper suggest that more investment in higher education may be justified, while more research into the role of higher education in development is certainly warranted.

Introduction

Education is widely accepted as a leading instrument for promoting economic growth. For Africa, where growth is essential if the continent is to climb out of poverty, education is particularly important.

For several decades, development agencies have placed great emphasis on primary and, more recently, secondary education. But they have neglected tertiary education as a means to improve economic growth and mitigate poverty. The Dakar summit on “Education for All” in 2000, for example, advocated only for primary education as a driver of broad social welfare. It left tertiary education in the background.

Part of the reason for the inattention to higher education within development initiatives lies in the shortage of empirical evidence that it affects economic growth and poverty reduction.² After World War II, several economists, including Milton Friedman, Gary Becker, and Jacob Mincer, developed the “human capital” theory to examine the benefits of education for individuals and society. Friedman and his wife Rose originally suggested that there was no evidence that “higher education yields ‘social benefits’ over and above the benefits that accrue to the students themselves.” On the contrary, they hypothesized that higher education may promote “social unrest and political instability.”³

In contrast to this early view, recent evidence suggests higher education is a determinant as well as a result of income, and can produce public and private benefits.⁴ Higher education may create greater tax revenue, increase savings and investment, and lead to a more entrepreneurial and civic society. It can also improve a nation’s health, contribute to reduced population growth, improve technology, and strengthen governance. With regard to the benefits of higher education for a country's economy, many observers attribute India's leap onto the world economic stage as stemming from its decades-long successful efforts to provide high-quality, technically oriented tertiary education to a significant number of its citizens.

² JBG Tilak (2003): “Higher Education and Development.” Conference Paper: International Seminar: University XXI. Internet: www.mec.gov.br/univxxi/pdf/Jandhyala.pdf (Last accessed: May 6, 2005).

³ Milton Friedman and Rose Friedman (1980): *Free to Choose: A Personal Statement*. New York: Harcourt, Brace and Jovanovich, p. 34.

⁴ DE Bloom, M Hartley, and H Rosovsky (2006): “Beyond Private Gain: The Public Benefits of Higher Education”. In James J. F. Forest and Philip G. Altbach, eds., *International Handbook of Higher Education*.

Development perspectives on higher education may be changing. In 2003, the Africa Regional Training Conference on Tertiary Education highlighted the problems Africa faces in higher education and documented some innovative solutions.⁵ In a recent speech, UN Secretary General Kofi Annan argued:

The university must become a primary tool for Africa's development in the new century. Universities can help develop African expertise; they can enhance the analysis of African problems; strengthen domestic institutions; serve as a model environment for the practice of good governance, conflict resolution and respect for human rights, and enable African academics to play an active part in the global community of scholars.⁶

This study reviews the evidence on the impacts of tertiary education on economic growth and poverty reduction. Section 1 of the paper highlights the lack of emphasis on higher education within Sub-Saharan Africa. Section 2 presents a conceptual framework for the relationship of tertiary education to economic growth. Section 3 evaluates evidence in the literature that supports the existence of links between higher education and economic growth, and presents a panel data model using an aggregate production function to look at the strength of these links.

We recognize that African countries differ significantly from one another in characteristics that influence how higher education may affect economic growth. The policy environment, for example, which is important for allowing the fruits of higher education to benefit an economy, varies across countries. Some policies could have substantial negative effects that would impede the mechanisms by which increased higher education could lead to faster economic growth. Similarly, the differing political and economic histories and geographical circumstances of African countries have created an array of environments in which higher education institutions operate. These factors have also led to differences in near-term economic possibilities. Conclusions drawn here about the potential of higher education to affect economic growth must therefore be tempered by recognition of the many differences between countries. Even so, we believe that some conclusions may apply broadly, and we have tried to focus on these in our analysis.

⁵ World Bank (2004): "Improving Tertiary Education in Sub-Saharan Africa: Things That Work." Report of a regional training conference held in Accra, Ghana, September 22–25, 2004. Papers and final report available at www.worldbank.org/afr/teia.

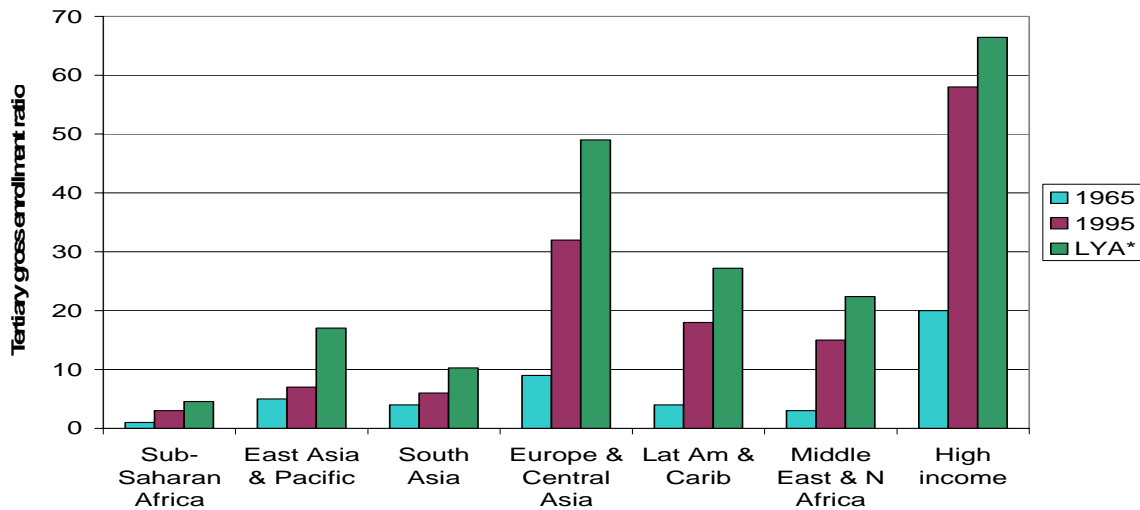
⁶ United Nations Information Service (2000): "Information Technology Should be Used to Tap Knowledge from Greatest Universities to Bring Learning to All, Kofi Annan Says." Press Release No: UNIS/SG/2625. August 3, 2000. Internet: www.unis.unvienna.org/unis/pressrels/2000/sg2625.html (Last accessed: May 6, 2005).

The State of Higher Education in Africa

Basic Facts

Enrollment rates in higher education in Sub-Saharan Africa are by far the lowest in the world. Although the gross enrollment ratio has increased in the past 40 years – it was just 1 per cent in 1965⁷ – it still stands at only 5 per cent.⁸ Figure 1 shows that the region's progress has been dwarfed by rapid gains in other regions. Enrollment rate growth has been slow in Sub-Saharan Africa, and the absolute gap by which it lags behind other regions has increased rapidly. The region's present enrollment ratio is in the same range as that of other developing regions 40 years ago. Moreover, gender disparities have traditionally been wide and remain so.

Figure 1. Sub-Saharan Africa Falls Further Behind



* LYA (latest year available) means that for each country, the most recent data available are used, and those data are then aggregated by region. For most countries LYA is 2002/2003. The range is 1998/1999 to 2003/2004.

Source: UNESCO and World Bank. See explanatory footnote in previous paragraph.

⁷ The Task Force on Higher Education and Society (TFHE) (2000): *Higher Education in Developing Countries: Peril and Promise*. World Bank, Washington DC.

⁸ This and other data in this paragraph are based on authors' calculations derived from data available online from UNESCO (www.uis.unesco.org). Data for most countries are for 2002/2003, though data for Sub-Saharan African countries are frequently for slightly earlier years, but in all cases no older than 1998/1999. All regional figures that appear in Figure 1 are population-weighted, based on 2002 population, taken from: United Nations, *World Population Prospects 2002*. Regional assignment of countries is based on: World Bank, *World Development Indicators 2004*.

The output of academic research in Africa also remains weak. In 1995, the region was responsible for just 5,839 published academic papers (South Asia produced 15,995 published papers, and Latin America and the Caribbean, 14,426). Only the Middle East and North Africa produced fewer papers than Sub-Saharan Africa, yet the former's total had doubled since 1981, while Sub-Saharan Africa's had risen by one third.⁹

The international development community has encouraged African governments' relative neglect of higher education. The World Bank, which exercises significant influence over developing country governments, has long believed that primary and secondary schooling are more important than tertiary education for poverty reduction. This belief stemmed from two important considerations: first, repeated studies appeared to show that the returns to investments in primary and secondary education were higher than those to higher education, and second, that equity considerations favored a strong emphasis on widespread access to basic education. From 1985 to 1989, 17 per cent of the Bank's worldwide education-sector spending was on higher education. But from 1995 to 1999, the proportion allotted to higher education declined to just 7 per cent, as the focus shifted to primary education in the wake of the Jomtien World Education Conference in 1990.

These reductions in spending have severely affected higher education in Africa. The average of 5 per cent gross tertiary enrollment masks wide disparities between countries. In several countries, enrollment stood at 1 per cent or less in 2003.¹⁰

Many countries are struggling even to maintain these low enrollment levels:

- In its Poverty Reduction Strategy Paper, the Government of Malawi reports difficulties with inadequate boarding facilities, weak links to industry that lead to high graduate unemployment, and inefficient use of resources by the University of Malawi.¹¹
- Despite its low enrollment ratio, Mauritania has problems stemming from over-crowding on campuses. Also, because curricula stress theory rather than skill competencies and are only weakly tailored to the country's labor force needs, graduate unemployment is high.¹²

⁹ TFHE (2000) op cit.

¹⁰ UNESCO Institute for Statistics (2005): *Global Education Digest 2005*. UIS, Montreal.

¹¹ Government of Malawi: Poverty Reduction Strategy Paper: 49–50.

¹² Government of Mauritania: Poverty Reduction Strategy Paper: 34.

- Mozambique reports few places for students and poor quality of courses. The high cost of tertiary schooling means that many potential candidates cannot attend. As a result, less than 3 per cent of the national public administration staff has received higher education.¹³

Higher Education and the Law

Prevailing legislation often hampers efforts to increase higher education enrollment and improve teaching quality in Africa (see appendices B and C for details of higher education laws in each country). In some countries, highly centralized policy making on higher education restricts the autonomy of universities and politicizes them, thus subverting the learning experience in response to political objectives. Policy centralization also makes it difficult for universities to be responsive to changes in knowledge, the labor market, and economic development. In other countries, meanwhile, a lack of centralization and system oversight allows fly-by-night private operations to fleece students or provide them a low-quality education at a high cost, a minimal return on their investment.

Benin, Cameroon, Madagascar, and Tanzania, are examples of countries where governments supervise many aspects of universities' operations. In Benin and Tanzania, the government appoints senior university managers. In Cameroon, the Minister of Education retains supervisory authority over universities. The Ministry of Education in Madagascar appoints all faculty members, sets salaries, and determines working conditions, which links faculty members closely to the political system.

Not all countries have stifling laws. Angolan law allows universities full autonomy in decision-making, and the state encourages the establishment of private higher education institutions. In Guinea and Liberia, public institutions have considerable legal autonomy, and a law passed in The Republic of Congo in 1990 allowed the private sector to provide tertiary schooling for the first time. As the government of South Africa has found, however, this can have negative effects as well, as some private higher education institutions offer low-quality education despite their high cost.

In sum, legal environments for higher education in Africa vary widely. Some countries keep public universities under the wing of government. Others grant them freedom to manage their own operations. Still others allow private universities to be established. In many countries, there are no laws governing higher education, a reflection of the tendency in much of the region to neglect the issue in policy making. As we discuss in the next section, this neglect and lack of coherence are echoed in the national

¹³ Government of Mozambique: Poverty Reduction Strategy Paper: 43–44.

Poverty Reduction Strategies, the donor community's most recent approach to development planning in Africa.

Poverty Reduction Strategy Papers and Higher Education

The World Bank's lack of emphasis on tertiary schooling has resulted in its absence from the Poverty Reduction Strategy Papers (PRSPs) of all but a few African countries. Except for larger projects in Ethiopia, Ghana, Mauritania, and Mozambique, only about twenty countries mention tertiary schooling in their PRSPs. In most of these, it is only a small element of the development strategy.

PRSPs prioritize measures to improve countries' economic situations. They are country-led documents drawn up by national governments, often with the guidance and support of the World Bank, the International Monetary Fund, and external development partners.

PRSPs are updated every three years to look anew at ways to encourage broad-based growth and ease poverty. They serve as a country's road map for addressing the first Millennium Development Goal of reducing extreme poverty. Many countries are required to complete PRSPs to gain access to the Highly-Indebted Poor Countries (HIPC) debt relief.

In Table 1, we analyze all available PRSPs from African countries for references to higher education. This includes 22 PRSPs and nine interim PRSPs (for more detail, see appendix A). Although all countries except Tanzania make some reference to higher education in their PRSPs, only three (Cameroon, Malawi, and Zambia) consider it a way to reduce poverty. Just two countries (Cameroon and Ethiopia) plan to increase tertiary education funding, with a further six explicitly planning to decrease funding.

The PRSPs highlight several common barriers to Africa's realization of the potential of higher education to promote economic growth. Poor infrastructure is cited by nine of the 31 countries, while the cost of higher education, weak student preparation for university, poor university management, and university overcrowding also bedevil many countries.

The areas for improvement identified by PRSPs are equally illuminating. They show a strong focus on the pathways through which higher education may affect economic development. For example, 23 countries cite increasing vocational and educational training as an area for improvement. Fourteen see tertiary education as a vehicle for bolstering teacher training and therefore the education sector as a whole, with long-term effects on the economy. For those seeking to persuade African governments to

rethink their education strategies, stressing the potential economic benefit of higher education appears to be a promising approach. We will explore this argument more fully below.

In general, the PRSPs do not recognize some of the specific contributions of higher education to Africa's development needs. High among these is physical infrastructure development: constructing roads, railways, power plants, telecommunications, etc. If Africa had more people well trained in these areas (and if financial barriers could be overcome), strengthening the continent's infrastructure would be easier. For example, road-building costs in Sub-Saharan Africa are as high as those in OECD countries – and are often three times higher than costs in middle-income countries – because of the need to import both equipment and trained expatriate personnel. Cracking this dilemma may start with the enhancement of higher education opportunities and by ensuring that curricula match Africa's development needs. As noted above, the lack of infrastructure itself lessens the potential of higher education to boost economic growth. If higher education can empower more Africans to work on infrastructure in their own countries, this circular problem may become easier to address.

PRSPs may shy away from mentioning higher education because of a widely held, and not baseless, perception that educating Africans at the tertiary level simply leads to “brain drain.” This phenomenon is widespread throughout the developing world, and countries are understandably wary of channeling funds to benefit individuals who then leave, often never to return. The United Nations Conference on Trade and Development (UNCTAD) estimates that roughly 30 per cent of the region's university-trained professionals live outside Africa.¹⁴ A recent estimate suggests that up to 50,000 African-trained Ph.D.s are working outside Africa.¹⁵ The problem is especially acute among medical professionals. Many Africans have long asserted that the keys to keeping educated people in their countries are attractive working conditions and salaries and a more vibrant, self-sustaining, local intellectual community.

Among the more concrete commitments to higher education made – some of whose dates have already passed – in the 31 PRSPs analyzed are the following (with more details available in Appendix A):

- Burkina Faso: Increase higher education by 50 per cent; increase public vocational education by 116 per cent. Burkina Faso sets aside no money for improvements in tertiary education.

¹⁴ InterAcademy Council (2004): *Realizing the Promise and Potential of African Agriculture*. Amsterdam: InterAcademy Council: 180.

¹⁵ Jean-Jacques Cornish. "Blair, the colonial governor?" June 13, 2005. *Mail & Guardian Online*. South Africa.

- Burundi: Establish a National Education and Training Plan to strengthen technical education and university programs.
- Cameroon: Increase private sector involvement in capacity development (including transport and physical infrastructure); create new universities. Cameroon proposes to increase the share of the education budget allocated to higher education from 3.8 per cent to 5.8 per cent.
- Chad: Develop short courses to supplement skills.
- Djibouti: Open a university in Djibouti.
- Guinea: Create a support program for the development of higher education.
- Madagascar: Hire 150 university-level teachers.
- Malawi: Reserve 30 per cent of university places for girls; introduce scholarship schemes for girls and needy students; expand university places from 3526 to 6824. Malawi pledges no increase in spending, however.
- Mali: Establish a Technological Institute for Civil Engineering and Mines; start a Vocational Training Consolidation Project. Mali pledges to cut the share of higher education in total education spending from 19 per cent in 2000 to 14 per cent in 2003.
- Mauritania: Build technical training centers tailored to market needs.
- Niger: Increase the proportion of enrollments in technical and vocational training schools from 8 per cent of secondary school graduates in 2001 to 20 per cent in 2005 and 50 per cent in 2015.
- Senegal: Create training centers aimed at women.
- Uganda: Increase tertiary enrollment from 25,000 in 2000 to 50,000 in 2003.

A Global Shift

The above proposals show the beginning of a shift in the international policy community's attitude toward higher education. In recent years, key organizations such as the World Bank and major donor governments have begun to appreciate the importance of tertiary schooling for economic development. Donors have come to accept that in a multi-pronged development strategy, all levels of education are important.

In 1999, the World Bank published *Knowledge for Development*, a report that looked at how developing countries could use knowledge to narrow the income gap with rich world economies. It showed a correlation between education in mathematics, science, and engineering and improved economic performance. It also showed that the private rate of return to tertiary education, at 20 per cent, was similar to that for secondary schooling. The report recommended that developing countries train teachers using distance learning and create open universities that use satellites and the Internet to deliver courses.¹⁶

Along with UNESCO, the World Bank then convened a Task Force on Higher Education and Society, which brought together experts from thirteen countries to explore the future of tertiary education in developing countries. The Task Force report, *Higher Education in Developing Countries: Peril and Promise*, argued that higher education is essential to developing countries if they are to prosper in a world economy where knowledge has become a vital area of advantage. “The quality of knowledge generated within higher education institutions and its availability to the wider economy,” the report stressed, “is becoming increasingly critical to national competitiveness.”¹⁷

A subsequent World Bank report, *Constructing Knowledge Societies: New Challenges for Tertiary Education*, generated further momentum for higher education.¹⁸ This work stressed the role of tertiary schooling in building technical and professional capacity and bolstering primary and secondary education. Although the report maintained the Bank’s emphasis on primary and secondary schooling – it stated that higher education should receive no more than 20 per cent of a country’s total education budget – it also argued that the state should create enabling frameworks to encourage tertiary education institutions. Countries, it suggested, should not focus only on rate of return analyses, but also take account of the “major external benefits” of higher education.

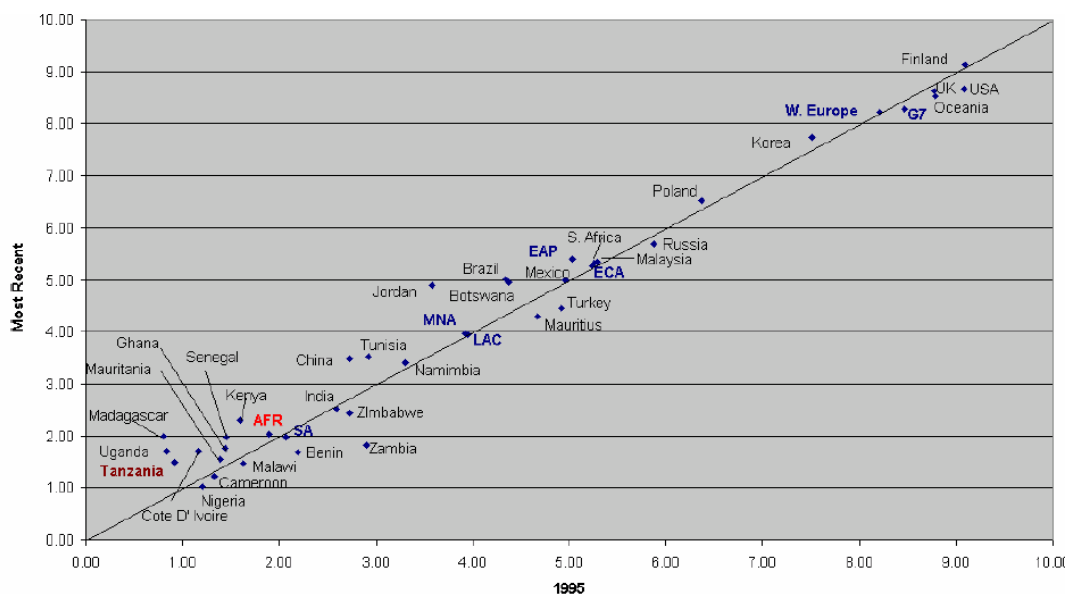
To monitor its new emphasis on knowledge, the World Bank has created a Knowledge Economy Index (KEI). This benchmarks countries’ performance on four aspects of the knowledge economy – the favorability for knowledge development within the economic and institutional regime; education; innovation; and information and communications technology. As Figure 2 shows, most African countries languish near the bottom of the KEI. South Africa, Botswana, and Mauritius record scores near the middle, but Nigeria, Cameroon, Malawi, Tanzania, and others have struggled, scoring less than two out of a possible ten points.

¹⁶ World Bank (1999): World Development Report: Knowledge for Development. World Bank, Washington DC

¹⁷ TFHE (2000) op cit.

¹⁸ World Bank (2002): *Constructing Knowledge Societies: New Challenges for Tertiary Education*. World Bank, Washington DC.

Figure 2. Knowledge Economy Index¹⁹



Note: Countries above the 45 degree line have improved their position in the KEI for the most recent period relative to their position in 1995 (or closest available date in the mid-90s), and vice versa for countries below the line. © K4D, WBI

The most recent confirmation of the shift toward higher education is found in the report of the Commission for Africa, which marks the clearest signal yet that the international community has come to recognize higher education’s value for development. In the Executive Summary of the report, the Commission recommends that donors increase investments in Africa’s capacity, “starting with its system of higher education, particularly in science and technology.” The report describes Africa’s tertiary education system as being in a “state of crisis,” and urges the international community to provide \$500 million a year to strengthen the region’s higher education institutions and up to \$3 billion over ten years to develop centers of excellence in science and technology.

The African Response

Some African countries have begun to respond to this shift in global thinking and to act on PRSP commitments to higher education. The following are examples of the progress that has been made:

- The Ethiopian Parliament’s Higher Education Proclamation in June 2003 set in motion major reforms to the country’s higher education system. It gave substantial autonomy to universities by allowing them to choose their own staff at all levels; encouraged the development of private universities; introduced new degree courses that better fit the

¹⁹ World Bank Institute (2004): “Tanzania and the Knowledge Economy: Preliminary Assessment.” World Bank Institute Knowledge for Development Program, 19 July.

country's economic needs; established a national Quality and Relevance Assurance Agency; launched a new capacity building program for information and communication technologies (ICTs); increased the share of the education budget allotted to higher education from 15 per cent to 23 per cent since 2000; and introduced a new graduate tax, which enables students to repay the cost of university education to the government by way of a tax deducted from their income after graduation.²⁰

- Mozambique's decision in 1997 to emphasize post-secondary education²¹ led to a national commission and to the creation in January 2000 of the Ministry of Higher Education, Science and Technology. Mozambique recognized an opportunity – helped by debt relief, significant southern African cooperation in higher education, and high interest among the business community, multilateral agencies, and donors – to improve higher education. In May and June 2000, ten regional consultations were held with higher education institutions, students, businesses, regional governments, and civic associations. These consultations led to a *Strategic Plan for Higher Education in Mozambique 2000–2010*, and later to a new higher education law in November 2002.
- An Education Sector Project, a five-year collaboration between the World Bank and the Government of Ghana, contains a major component that aims to improve the quality of Ghana's tertiary education system. Its main vehicle is a Teaching and Learning Innovation Fund to which academic units in universities and polytechnics can apply for funds to introduce new or different approaches to the provision of higher education.
- Efforts to achieve gender equity in higher education have focused on affirmative action policies. Ghana, Kenya, Uganda, Tanzania, and Zimbabwe have lowered admission cut-off points for female candidates. Female enrollment in Ghana and in Uganda's Makerere University grew by 6 and 7 percentage points respectively between 1990 and 1999, while in Tanzania's University of Dar Es Salaam, female enrollment grew from 19.5 per cent to 27 per cent between 1997 and 2000.²² Some universities have also introduced bridging courses

²⁰ World Bank (2003): "Higher Education Development for Ethiopia: Pursuing the Vision." World Bank Sector Study, January.

²¹ Lidia Brito (2003): "The Mozambique Experience: Initiating and Sustaining Tertiary Education Reform." Conference paper available at www.worldbank.org/afr/teia (Last accessed: May 5, 2005).

²² Grace W Bunyi (2003): "Interventions that increase enrollment of women in African tertiary institutions." Case study prepared for a Regional Training Conference on "Improving Tertiary Education in Sub-Saharan Africa: Things That Work," Accra, September 23–25.

to help women make the leap from secondary to tertiary schooling; others such as Makerere have established gender units to conduct research on female education and equity.

- Uganda's Makerere University has also improved its financial situation. By encouraging privately sponsored students – 70 per cent of students now pay fees – and commercializing service units, it has reduced its dependency on state funds and generates 30 per cent of its running costs. Enrollment doubled in the 1990s.²³
- The Kigali Institute of Science, Technology and Management (KIST) has tried to produce more technology graduates in Rwanda. When the University opened in 1997, the country had fewer than 50 technology-trained professionals. KIST is now graduating over 200 each year.²⁴
- The spread of distance-learning institutions in Sub-Saharan Africa has accelerated in recent years. The Open Learning Network of the University of KwaZulu-Natal in South Africa combines distance learning with off-hours instruction on Saturday. It hires school buildings in rural and disadvantaged areas to provide extra tutoring to students on Saturdays; the university now has nine of these centers off-campus.²⁵ The University of Namibia and the Université Marien Ngouabi in Congo-Brazzaville combine distance learning with face-to-face schooling, while Tanzania's Open University has over 10,000 students and the Zimbabwe Open University over 18,000. Nigeria has recently established an Open University, and other countries such as Ghana and Ethiopia have announced their intention to follow suit.
- New regional partnerships have also emerged. The Southern Africa Regional Universities Association (SARUA) is a partnership to help promote leadership, spread best practice,

²³ David Court (1999): "Financing Higher Education in Africa: Makerere, the Quiet Revolution." World Bank Tertiary Education Thematic Group publication series, April.

²⁴ Silas Lwakabamba (2003): "The New Kid on The Block." Case study prepared for a Regional Training Conference on "Improving Tertiary Education in Sub-Saharan Africa: Things That Work," Accra, September 23–25.

²⁵ Fiona Bulman (2003): "Improvements in Access/Lifelong Learning: The Saturday University." Case study prepared for a Regional Training Conference on "Improving Tertiary Education in Sub-Saharan Africa: Things That Work," Accra, September 23–25.

develop public policy dialogues, and encourage initiatives that respond to regional and continental needs.²⁶ It has 46 members from 13 countries.

- The Programme de Troisième Cycle Interuniversitaire (PTCI), an interuniversity graduate program in economics, operates in five institutions in West Africa. Set up to rectify weak graduate-level economics training in Francophone Sub-Saharan Africa, the program prepares students for the Diplôme d'Etudes Approfondies (DEA). In ten years of operation, PTCI has significantly increased the number of holders of the DEA in economics in the region.²⁷

²⁶ Regional Association of Universities in Southern Africa (2004): "African Higher Education: A Driver for Development." Internet: 213.225.140.43/english/consultation/submissions/ro/sb-nov-dec04-228.pdf (Last accessed: May 5, 2005).

²⁷ Karamoko Kane (2003): "Experimenting Regionalization in Tertiary Education: The Interuniversity graduate Program in Economics." Case study prepared for a Regional Training Conference on "Improving Tertiary Education in Sub-Saharan Africa: Things That Work," Accra, September 23–25.

3

The Conceptual Links from Higher Education to Economic Growth

Signs of progress for higher education are appearing in Sub-Saharan Africa. The international development community has begun to recognize the importance of advanced schooling, while some African countries have introduced innovative policies to strengthen tertiary education systems.

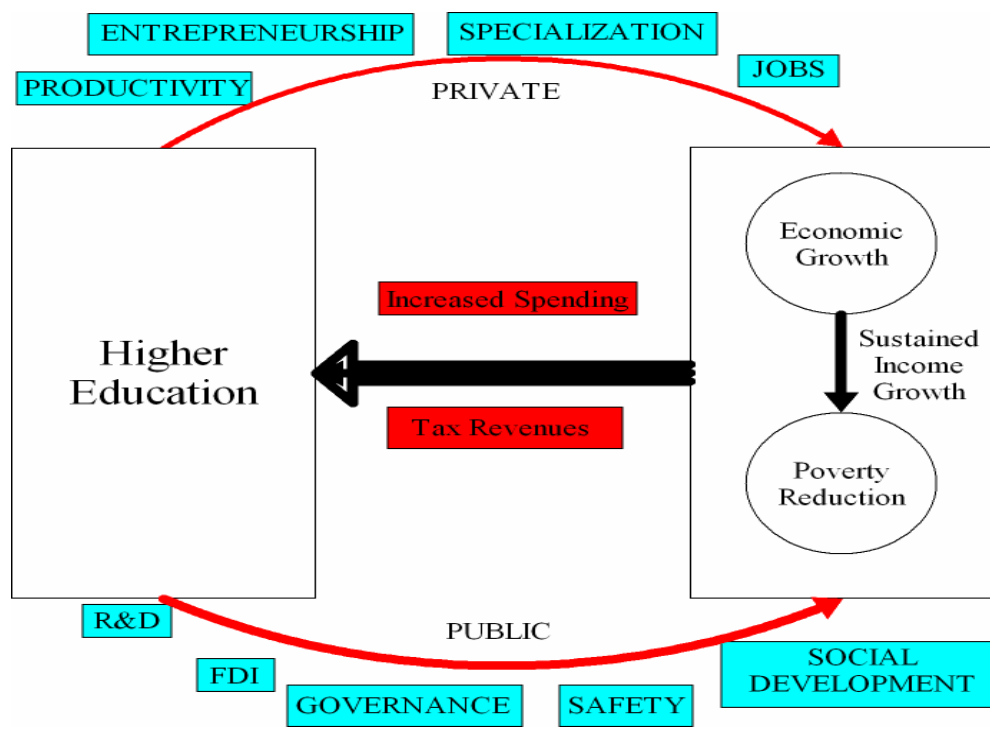
As we saw at the start of Section 1, this progress is small in comparison with the progress of other world regions, perhaps partly as a result of insufficient understanding of the positive effects that higher education can have on economic development. In this section we present a conceptual framework outlining how these effects might occur.

As Figure 3 shows, higher education can lead to economic growth through both private and public channels. The private benefits for individuals are well established and include better employment prospects, higher salaries, and a greater ability to save and invest. These benefits may result in better health and improved quality of life, thus setting off a virtuous spiral in which life expectancy improvements enable individuals to work more productively over a longer time further boosting lifetime earnings.

Public benefits are less widely recognized, which explains many governments' neglect of tertiary schooling as a vehicle for public investment. But individual gains can also benefit society as a whole. Higher earnings for well-educated individuals raise tax revenues for governments and ease demands on state finances. They also translate into greater consumption, which benefits producers from all educational backgrounds.

In a knowledge economy, tertiary education can help economies keep up or catch up with more technologically advanced societies. Higher education graduates are likely to be more aware of and better able to use new technologies. They are also more likely to develop new tools and skills themselves. Their knowledge can also improve the skills and understanding of non-graduate co-workers, while the greater confidence and know-how inculcated by advanced schooling may generate entrepreneurship, with positive effects on job creation.

Figure 3. Conceptual Framework



Tertiary schooling can also have less direct benefits for economies. By producing well-trained teachers, it can enhance the quality of primary and secondary education systems and give secondary graduates greater opportunities for economic advancement. By training physicians and other health workers, it can improve a society’s health, raising productivity at work. And by nurturing governance and leadership skills, it can provide countries with the talented individuals needed to establish a policy environment favorable to growth. Setting up robust and fair legal and political institutions and making them a part of a country's fabric, and developing a culture of job and business creation, for example, call for advanced knowledge and decision-making skills. Addressing environmental problems and improving security against internal and external threats also place a premium on the skills that advanced education is best placed to deliver.

Although none of these outcomes is inevitable, the framework presented in Figure 3 does suggest many possible routes through which higher education can benefit economies. In the next section, we assess the evidence that supports these links, and present new evidence of our own.

The Supporting Evidence

The Literature

Conventional rate of return analysis shows higher education in a less favorable light than it shows primary and secondary schooling. Psacharopoulos and Patrinos reviewed 98 country studies from 1960–1997 and found that the typical estimates of the rate of return from primary schooling were substantially higher than those for advanced schooling. The average public rate of return for the former was 18.9 per cent, while for tertiary education it was just 10.8 per cent.²⁸ Such studies have had a major influence on international development policy.

More recent studies cast some doubt on the applicability of these findings.²⁹ Traditional rate of return analysis focuses solely on the financial rewards accrued by individuals and the tax revenues they generate. It neglects the broader benefits of advanced education manifested through entrepreneurship, job creation, good economic and political governance, and the effect of a highly educated cadre of workers on a nation’s health and social fabric. It also ignores the positive impacts of research – a core tertiary education activity – on economies.

A series of studies have taken into account the broader impacts of higher education:

- In a cross-sectional study, Barro and Sala-i-Martin found that male educational attainment, particularly secondary and tertiary education, had significant positive growth effects.³⁰ An increase in average male secondary schooling of 0.68 years raises annual GDP growth by 1.1 percentage points, while an increase in tertiary education of 0.09 years raises annual growth by 0.5 percentage points. They find an interaction between initial GDP and human capital (broadly defined, including health and education), so that countries that lag behind tend to grow faster if they have high levels of human capital.
- In a time series analysis of the United Kingdom, Jenkins looked at an index of total factor productivity and its relationship to different levels of educational attainment.³¹ When higher

²⁸ G Pasacharopoulos and H Patrinos (2002): “Returns to Investment in Education: A Further Update.” World Bank Policy Research Working Paper 2881, September.

²⁹ See TFHE (2000) op cit. and DE Bloom, M Hartley, and H Rosovsky (2006), op cit.

³⁰ Robert J Barro and Xavier Sala-i-Martin (1995). *Economic Growth*. New York: McGraw-Hill.

³¹ H Jenkins (1995): “Education and Production in the United Kingdom.” Economics Discussion Paper No 101, Nuffield College, Oxford University.

education qualifications (including undergraduate, postgraduate, and other tertiary graduate stock) increased by 1 per cent, annual output grew between 0.42 and 0.63 per cent.

- A study in Taiwan showed that higher education played a strong role in the country's economic growth.³² It found that a 1 per cent rise in higher education stock (as defined by those who had completed higher education, including junior college, college, university, or graduate school) led to a 0.35 per cent rise in industrial output, and that a 1 per cent increase in the number of graduates from engineering or natural sciences led to a 0.15 per cent increase in agricultural output. This work examined the effects of concentration in different disciplines and concluded that study of the natural sciences and engineering had the largest effect on output.
- Wolff and Gittleman showed that university enrollment rates are correlated with labor productivity growth. The number of scientists and engineers per capita is also associated with economic growth.³³
- In a study of six developed countries, De Meulemeester and Rochat showed that higher education had a strong causal impact on economic growth in France, Japan, Sweden, and the United Kingdom, but no impact in Australia and Italy. The authors conclude that higher education is necessary for growth but not sufficient. "It is vital," they argue, "that the social, political, and economic structures and the technological level of the society to which the educational system belongs are such that graduates can actually make use of their accumulated knowledge."³⁴
- Bloom, Hartley, and Rosovsky showed that workers in US states where the proportion of college graduates is high earn significantly more than those in states with few graduates, whether or not they have received a tertiary education themselves.³⁵ Unfortunately, we know of no comparable study investigating such spillovers in developing countries.

³² T-C Lin (2004): "The Role of higher education in economic development: an empirical study of Taiwan case." *Journal of Asian Economics* 15 (2): 355–371.

³³ EN Wolff and M Gittleman (1993): "The role of education in productivity convergence: does higher education matter?" In A Szirmai, B van Ark, and D Pilat (eds), *Explaining Economic Growth*. Amsterdam: North-Holland.

³⁴ Jean-Luc de Meulemeester and Denis Rochat (1995): "A causality analysis of the link between higher education and economic development." *Economics of Education Review* (14) 4: 251–361.

³⁵ DE Bloom, M Hartley, and H Rosovsky (2006), op cit.

- The same study showed a positive correlation between higher education and entrepreneurship.³⁶ The authors used Babson College’s Global Entrepreneurship Monitor’s Total Entrepreneurship Activity (TEA) Index, which uses information from 17 countries to measure the share of adults involved in new firms or start-up activities. Individuals with higher education levels were more likely to engage in entrepreneurial activity, and more-educated entrepreneurs created larger numbers of jobs than less-educated entrepreneurs.
- Another channel for improvement is through research and development, which can boost economic growth and productivity growth. In a recent World Bank study, Lederman and Maloney conducted a cross-country regression analysis that showed that the rate of return on R&D was 78 per cent.³⁷
- Bloom et al. found a positive and statistically significant correlation between higher education enrollment rates and governance indicators, including absence of corruption, rule of law, absence of ethnic tensions, bureaucratic quality, low risk of repudiation of contracts by governments, and low risk of appropriation.³⁸

New Evidence

The traditional method for estimating macroeconomic impacts uses a regression approach to determine the rate of growth of income per capita measured against an initial level of education (such as total years of schooling), with controls for initial levels of income and other factors that may influence steady-state income levels (such as openness to trade, institutional quality, and geographic characteristics).

To analyze the effects of education and health on output, Weil and colleagues applied an aggregate production function and calibrated parameters of the production function.^{39,40} But Weil did not look specifically at the effects of tertiary education. Our analysis examines improvements in labor productivity and output per worker as levels of tertiary education increase. The challenge in this method is ensuring that the parameters of the production function are accurately calibrated.

³⁶ DE Bloom, M Hartley, and H Rosovsky (2006), op cit.

³⁷ D Lederman and WF Maloney (2003): “R&D and Development.” Policy Research Working Paper No. 3024. World Bank.

³⁸ Bloom et al. (2006) op cit.

³⁹ D Weil (2005): “Accounting for the Effect of Health on Economic Growth.” NBER Working Paper No. W11455. July.

⁴⁰ GK Shastry and DN Weil (2003): “How much of Cross-Country Income Variation is Explained by Health?” *Journal of the European Economic Association* 1: 387–396.

At the national and regional levels, the variation in education, either by cross-section or time series, is correlated with the error term in the equation determining income. Our method accentuates the proximal differences in education (e.g. how much richer Malawi would be compared to the United States if all its citizens were as well educated as American citizens) rather than the total effects of an exogenous education environment.

We estimate the production function directly using specifications similar to those used by Weil and by Bloom and Canning, which allows comparisons between our estimates and previous calibrated parameters.^{41,42} Mankiw argued that estimation methods may capture the effects of health and education on total factor productivity (TFP) that may be missed by calibration techniques concentrating on wage equations.⁴³

Prescott commented that an explanation of large international income differences requires a theory of total factor productivity.⁴⁴ He concluded that neither capital per worker nor human capital sufficiently captures international income differences by itself and that over half the income gap between rich and poor countries was caused by unexplained differences in total factor productivity.

To analyze the production function, it is important to control for the different levels of TFP and rates of technological progress. Without controlling for these differences, reverse causality may cause difficulties. Increases in TFP raise output, usually leading to higher levels of saving and investment. Without the careful use of controls the extra investment induced by economic growth can appear to be the cause of the growth. To control for this effect, we follow methods set out by De La Fuente and Domenech⁴⁵ and Bloom, Canning, and Sevilla⁴⁶ to allow for different steady-state levels of TFP across countries and technological diffusion over time.

⁴¹ Weil (2005) op cit.

⁴² DE Bloom and D Canning (2005): "Health and Economic Growth: Reconciling the Micro and Macro Evidence." In press.

⁴³ Total factor productivity measures maximal productivity for a given set of inputs. NG Mankiw (1997): "Comment on Klenow and Rodriguez-Clare." In B Bernanke and J Rotemberg (eds) *NBER Macroeconomics Annual*. MIT Press, Cambridge, MA.

⁴⁴ EC Prescott (1998): "Lawrence R. Klein Lecture 1997: Needed: A Theory of Total Factor Productivity." *International Economic Review* 39(3): 525–551.

⁴⁵ A De la Fuente and R Domenech (2001): "Schooling Data, Technological Diffusion, and the Neoclassical Model." *American Economic Review Papers and Proceedings* 91(2): 323–327.

⁴⁶ DE Bloom, D Canning, and J Sevilla. (2004) "The Effect of Health on Economic Growth: A Production Function Approach." *World Development*. 32 (1): 1–13.

Earlier studies have suggested that schooling may have little impact on productivity.⁴⁷ De La Fuente and Domenech suggest that this finding may be the result of measurement error in international schooling data; when a high-quality dataset available for OECD countries is used, a significant effect is found.⁴⁸ It is difficult to construct high-quality data for developing countries. Our approach to this problem is to use instrumental variables to control for measurement error. In our model, we use literacy rates as an instrument for total years of education, and doctors per capita as an instrument for tertiary education. These instruments overcome “noise” in the education data (random measurement error), provided that their measurement errors are not correlated with this noise. But this approach cannot overcome systematic measurement error (e.g., if all African countries systematically under- or over-report education levels).

In this study, we are interested in investigating two different means by which tertiary education can improve economic growth.

- 1) Raising GDP directly through a productivity effect; and
- 2) Increasing the speed at which a country adopts technology and raises its total factor productivity.

Empirical Specification. Using Bloom and Canning’s model for health and economic growth,⁴⁹ we develop a similar model for education and economic growth to make comparison easier.

Using a Cobb-Douglas production function:

$$Y = AK^\alpha (Lv)^\beta \quad [1];$$

where Y is GDP, A represents TFP, K is physical capital, and L is labor force. Furthermore, v is the level of human capital per worker, and V=Lv is the effective labor input.

The human capital of a worker j can be modeled:

$$v_j = e^{\phi_s s_i + \phi_h h_i} \quad [2];$$

where s_i represents the total years of schooling, and h_i represents health.

The total level of human capital is:

⁴⁷ Mankiw (1997) op cit.

⁴⁸ De la Fuente and Domenech (2001) op cit.

⁴⁹ Bloom and Canning (2005) op cit.

$$V = \sum_j v_j = \sum_j e^{\phi_s s_i + \phi_h h_i} \quad [3];$$

The difficulty with this form of the equation is that national statistics tend to give simple arithmetic averages. But by assuming a lognormal distribution, the log of the average wage equals the log of the median wage plus half the variance of wages. The log of the median wages equals the average of log wages, since log wages have a symmetrical distribution.

This simplifies to:

$$\log V = \phi_s s_i + \phi_h h_i + \sigma^2 / 2 \quad [4];$$

where σ is the standard deviation in log wages. This implies that the distribution of wages matters for aggregate output. But because we lack data on wage distributions, this term is ignored for the present.

Therefore, the aggregate production function can be summarized as:

$$\log Y = a + \alpha \log K + \beta(\log L + \phi_{psi} s_{psi} + \phi_{ts} s_{ti} + \phi_h h) \quad [5];$$

At the country level, the output is:

$$y_{it} = a_{it} + \alpha k_{it} + \beta(l_{it} + \phi_s s_{it} + \phi_h h_{it}) \quad [6];$$

where y_{it} , k_{it} and l_{it} are the logs of Y_{it} , K_{it} and L_{it} respectively. The advantage of this formulation of the aggregate production function, as shown by Bloom, Canning, and Sevilla, is that it is consistent with the Mincer wage equation at the microeconomic level, and so the coefficient on schooling can be interpreted as the rate of return to schooling.

In practice a_{it} , the level of TFP in country i at time t , is not observed directly. Bloom, Canning, and Sevilla's approach to processing diffusion is to follow a diffusion process across countries, allowing for the possibility of a long-run difference in TFP even after diffusion is complete.⁵⁰

The level of TFP adjusts to its ceiling level at

$$\Delta a_{it} = \lambda^* (a_{it}^* - a_{i,t-1}) + \varepsilon_{it} \quad [7];$$

⁵⁰ DE Bloom, D Canning, and J Sevilla (2002): *Technological Diffusion, Conditional Convergence and Economic Growth*. NBER Working Paper No. 8713. Cambridge.

where ε_{it} is a random shock, a ceiling level of TFP given by a_{it}^* , and TFP adjusts toward this ceiling at rate λ^* . The ceiling level of TFP for a country depends on country characteristics and the worldwide technology frontier:

$$a_{it}^* = \delta x_{it} + a_t \quad [8];$$

where x_{it} are country-specific variables that affect TFP and a_t is a time dummy of current worldwide TFP.⁵¹ Several variables may affect long-run TFP including institutions and “social infrastructure”⁵² and geography.⁵³

To determine the technological catch-up coefficient taking tertiary education into account, we use the following equation:

$$\lambda^* = \lambda + \sigma s_{h,t-1} \quad [9];$$

where $s_{h,t-1}$ is the lagged level of higher education. This is similar to the approach to technological catch-up used by Benhabib and Spiegel,⁵⁴ except that here higher education is emphasized rather than total education.

Bloom and Canning rearrange equation [6] to provide a lagged level of total factor productivity:⁵⁵

$$a_{i,t-1} = \alpha k_{i,t-1} + \beta(l_{i,t-1} + \phi_s s_{i,t-1} + \phi_h h_{i,t-1}) - y_{i,t-1} \quad [10];$$

and differentiating the country-wide aggregate output leads to:

$$\Delta y_{it} = \Delta a_{it} + \alpha \Delta k_{it} + \beta(\Delta l_{it} + \phi_s \Delta s_{it} + \phi_h \Delta h_{it}) \quad [11];$$

Substituting [7], [8], and [9] into [11] gives the key growth equation:

$$\Delta y_{it} = \alpha \Delta k_{it} + \beta(\Delta l_{it} + \phi_s \Delta s_{it} + \phi_h \Delta h_{it}) + \lambda^* (a_t + \delta x_{it} + \alpha k_{i,t-1} + \beta(l_{i,t-1} + \phi_s s_{i,t-1} + \phi_h h_{i,t-1}) - y_{i,t-1}) - \varepsilon_{i,t-1} \quad [12];$$

⁵¹ Bloom and Canning (2005) op cit.

⁵² RE Hall and CI Jones (1999): “Why Do Some Countries Produce So Much More Output per Worker than Others?” *Quarterly Journal of Economics* 114 (1): 83–116.

⁵³ JL Gallup, JD Sachs, AD Mellinger (1999): “Geography and Economic Development.” *International Regional Science Review* 22(2): 179–232.

⁵⁴ J Benhabib and MM Spiegel (2003): “Human Capital and Technology Diffusion.” Development Research Institute Working Paper Series, No. 3, May. New York University.

⁵⁵ Bloom and Canning (2005) op cit.

De La Fuente and Domenech⁵⁶ and Bloom, Canning, and Sevilla⁵⁷ use this model to allow for TFP diffusion in cross-country production function studies. This implies that output is a function of: 1) growth in capital, labor, schooling and health inputs; 2) the closing of a country's TFP gap $a_{i,t-1}$ (which converges at the rate λ^*) to its ceiling level of TFP; and 3) shocks to a country's TFP, ε_{it} .

Equation [12] is a model of conditional convergence. The speed of convergence λ^* is the rate at which a country is converging to the worldwide technological frontier. This paper's innovation is to make the speed of convergence a function of the stock of higher education: We do not think of technology diffusion as being "free" or automatic. Instead, diffusion is dependent on the number of highly educated workers who can access new technologies.

Over the five-year intervals, all inputs are potentially correlated with contemporaneous productivity shocks. Therefore, all regressors must be instrumented by lagged variables in our estimation.

Data Sources. We construct an unbalanced panel dataset with data covering 1960 through 2000. The structure of the dataset is similar to that used by Bloom and Canning.⁵⁸ As noted earlier, the similarity in construction facilitates comparison between models. This dataset constructs tertiary education stock from primary and secondary stock through the addition of Barro and Lee data, to see whether tertiary education is associated with differences in aggregate output.^{59,60}

In a second analysis, we use the Cohen and Soto dataset to construct primary, secondary, and tertiary stock to see if our results remain robust.⁶¹

Output data were derived from the Penn World Tables (Version 6.1).⁶² Total output is measured by multiplying population by real per capita GDP measured in 1985 international purchasing power parity dollars (chain index).

⁵⁶ De La Fuente and Domenech (2001) op cit.

⁵⁷ Bloom, Canning, and Sevilla (2002) op cit.

⁵⁸ Bloom and Canning (2004) op cit.

⁵⁹ R Barro and J Lee (1994): "Sources of Economic Growth." *Carnegie-Rochester Conference Series on Public Policy* 40: 1–46.

⁶⁰ R Barro and J Lee (2000): "International Data on Educational Attainment: Updates and Implications." Working Paper no. 42. Harvard University Center for International Development. Cambridge, MA.

⁶¹ D Cohen and M Soto (2001): "Growth and Human Capital: Good Data, Good Results." Discussion Paper No. 3025. Centre for Economic Policy Research. London, United Kingdom.

⁶² Alan Heston, Robert Summers, and Bettina Aten (2002): *Penn World Table Version 6.1*. Center for International Comparisons at the University of Pennsylvania (CICUP). Internet: <http://pwt.econ.upenn.edu/>

School data from the Barro-Lee dataset were broken down for primary, secondary, and tertiary education completed and attained for males and females above the age of 25.⁶³ To obtain this breakdown, we used data from the World Bank specifying the number of years of schooling required to complete primary and secondary education in the first available calendar year.⁶⁴ Combining the World Bank and Barro-Lee data, we ascribed one-half the years required to complete a level of schooling to individuals who attained, but did not complete, primary or secondary education (for example, an individual who attained, but did not complete six years of primary schooling would be given three years of education). Those who completed primary or secondary education were accorded the full number of years.

We estimated four years of schooling for completing tertiary education. Those who attained, but did not complete, tertiary education were accorded two years.

Thus, by combining the Barro-Lee and the World Bank data, we obtain the combination of primary, secondary, and tertiary education stock.

The economically active population was derived from International Labour Office (ILO) data.⁶⁵ The economically active population is not a perfect measure, because it fails to account for unemployment rates and hours worked. The data from the ILO provide information for 1960, 1970, 1980, 1990, and 1995, and an estimation for the year 2000. For 1965, 1975, and 1985, estimates were constructed of the economically active population. The ILO gives activity rates by sex and by five-year age cohort. The rates were interpolated and in conjunction with data on population by sex and five-year age cohorts from *World Population Prospects* (2002) were used to generate estimates of the economically active population for these years.⁶⁶

The capital stock series for each country was computed by a perpetual inventory method.⁶⁷ The capital series was calculated using the first year for which investment data were available in the Penn World Tables (Version 6.1). This was calculated as three times the initial GDP in the time series for a country.

⁶³ Barro and Lee (2000) op cit.

⁶⁴ World Bank (2005): Education Statistics. Internet: <http://devdata.worldbank.org/edstats/cd.asp> (Last accessed: May 14, 2005).

⁶⁵ International Labour Office (2005): *Economically Active Population, 1950–2010*. Geneva: International Labour Office, Bureau of Statistics. Internet: <http://laborsta.ilo.org> (Last accessed: May 18, 2005).

⁶⁶ United Nations (2002): *World Population Prospects* 2002.

⁶⁷ See Bloom and Canning (2005), for more detail on the perpetual inventory method to calculate capital.

Subsequent years were calculated, assuming a 7 per cent depreciation rate and multiplying the investment rate by the GDP of the previous year.

Life expectancy was taken from the *World Development Indicators* (2003).⁶⁸ A weighted average life expectancy of men and women was used.

The analysis included country-specific variables that may affect the long-run level of TFP, including ethno-linguistic fractionalization,⁶⁹ openness to trade,⁷⁰ quality of institutions,⁷¹ percentage of land area in the tropics, and a dummy variable for being landlocked to control for geographic factors that may affect productivity and trade.⁷²

Results. A total of 103 countries were included in the study, with 843 observations. The parameters are estimated in equation [11] using quinquennial data from 1960–2000.

We used a non-linear estimator with lagged growth rates of inputs and lagged output growth as instruments for current growth rates. Five specific variables were examined for their potential influence on the ceiling level of TFP. These variables were: openness to trade, being in the tropics, being landlocked, ethno-linguistic fractionalization, and institutional quality. Only the first two variables, openness and percentage of land area in the tropics, were statistically significant at the five per cent level. The other three variables were therefore dropped from the regression analysis.

The results are shown in Table 1, Column [1]. Although we estimate a growth relationship, this is based on our production function and the coefficients can be interpreted as parameters of the production function. In this model, we instrument each input growth rate with its lagged value to avoid reverse causality. As expected, capital and labor are significant drivers of aggregate output. Health continues to be a small, but significant contributor to aggregate growth. For every added year of life expectancy, there appears to be an improvement in aggregate output by 0.032 per cent.

⁶⁸ World Bank (2003): *World Bank Development Indicators* 2003. World Bank, Washington DC.

⁶⁹ W Easterly and R Levine (1997): “Africa’s Growth Tragedy: Policies and Ethnic Division.” *Quarterly Journal of Economics* 112 (4): 1203–1250.

⁷⁰ J Sachs and A Warner (1995): “Economic Reform and the Process of Global Integration.” *Brookings Papers on Economic Activity* 1: 1–118.

⁷¹ S Knack and P Keefer (1995): “Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures.” *Economics and Politics* 7(3): 207–227.

⁷² Gallup, Sachs, and Mellinger (1999) op cit.

We do not find a significant effect of the total education stock in the production function. Furthermore, the first equation indicates the occurrence of technological convergence. But this catch-up appears to be automatic, and increasing tertiary education does not seem to have a significant additional effect on the speed of technological convergence.

The most likely explanation for the lack of effect of the education variables as shown in Column [1] of Table 2 is measurement error. We proceeded to instrument the education variables, using literacy rates to instrument total education and doctors per capita for tertiary education. First-stage regressions showed that these instruments are indeed correlated with the relevant education variable. In this model (Table 1, Column [2]), each added year of education plays a large role in raising aggregate output at the 10 per cent – but not the 5 per cent – significance level. Furthermore, the technological catch-up coefficient from tertiary education promotes faster technological convergence, significant at the 10 per cent level, but not the 5 per cent level. In this model, capital and labor are still highly significant, as is the impact of health and being in the tropics. Thus, increasing tertiary education appears to raise the rate of technological convergence toward a country's production possibility frontier.⁷³

We experimented with different combinations of primary, secondary, and tertiary education, for both the production function effect and the technological catch-up effect, but none of the alternative combinations showed an improvement in fit. No other component of education was significant in affecting technological catch-up.

We then analyzed whether Africa is close to the production possibility frontier. Africa can only benefit from technological catch-up if there is a gap between current production and the production possibility frontier. We analyzed the GDP difference between the predicted level of GDP and the initial level of GDP to determine the extent of the production possibility frontier gap.

The results for various regions are shown in Table 2. Africa appears to be 23 per cent lower than its production possibility frontier, which is the highest gap of all world regions (see Table 3). Note that the estimated productivity ceiling in Africa is considerably lower than for some other regions, because of its climate and geography.

⁷³ Re-estimating the parameters of the model using the Cohen-Soto dataset provides further support for these findings, which rely on the Barro-Lee data. Each year of education is still significant at the 10 per cent level, but not the 5 per cent level. Furthermore, the technological catch-up coefficient from tertiary education that promotes faster technological convergence remains significant at the 10 per cent level, but not at the 5 per cent level.

Our model therefore has two key components: the first is the effect of increasing the stock of education on potential GDP, and the second is the effect of tertiary education in spurring growth toward the production frontier of the continent.

After imputing the variables for the technological lag and the effect of higher education on technological catch-up, we find that a one-year increase in the total education stock would raise the long-run steady-state level of African GDP per capita due to factor inputs by 12.2%. This effect would not be immediate. The growth rate of GDP per capita would rise by about 0.24 percentage points in the first year as a result of convergence to a higher steady state (but assuming no change in the rate of convergence). As the economy approaches the higher steady state, the induced growth will slow, due to a higher level of income (at the steady state the growth effects of the higher level of education are exactly matched by the negative effect of the higher level of income). A one-year increase in tertiary-education stock would have similar effects on steady-state GDP per capita due to higher educational inputs, but would also raise African output growth by an added 0.39 percentage points in the first year due to faster technological catch-up, generating a total increase of 0.63 ($=0.24+0.39$) percentage points in the first year. This higher rate of technological catch-up growth, 0.39 percentage points, would be sustained until Africa reaches the World technological, or productivity, frontier. Although these figures may not appear large at first glance, they imply that a one-year increase in tertiary education stock may boost incomes by roughly 3 percent after five years⁷⁴ and by 12 percent eventually. Considering that incomes have been falling in some African countries, such growth would be significant.

If Africa were only to double current tertiary education levels from 0.147 years per person to 0.294 years per person,⁷⁵ it would increase steady-state output from a larger stock of total education by 1.8%. Growth rates would at first be about 0.04 percentage points per year higher than the initial growth rate, as the economy approaches this higher steady state. However the major impact of the improved higher education would be an additional 0.06 percentage points of growth in each year (as compared to the initial growth rate) due to faster technological catch-up. This would result in a total gain of 0.10 percentage points in the first year in economic growth, this growth effect slowly dissipating over time as the economy approaches its steady state (given its inputs) and the technology catch-up is completed.

⁷⁴ Each year, the boost in GDP growth rate, as compared to the initial GDP growth rate, will diminish slightly. The average boost during the first five years yields income levels roughly 3 percent higher at the end of five years.

⁷⁵ For clarity, these figures refer to the average number of years of higher education among the entire population, not just for those who are attending or have attended higher education.

If Africa were to raise current average individual tertiary education levels to those of the country with the highest rate on the continent (South Africa), from 0.147 years per person to 0.532 years per person, steady-state income per capita due to factor inputs would rise by 4.7%. Growth towards this higher steady state would rise by 0.09 percentage points in the first year. If the increased education were concentrated in tertiary education stock, the rate of technological catch-up would rise by 0.13 percentage points in the first year, resulting in an overall increase of 0.22 percentage points in the rate of economic growth in the first year.

Finally, we note that the coefficient on education (0.213, implying a rate of return of 21.3 per cent) is higher than, but not significantly different from, the average of the Psacharopoulos studies. This is consistent with the existence of a positive spillover from private to public returns, though the lack of statistical significance does not allow us to reject the null hypothesis that there are no spillovers.

Conclusion

Past studies linking education to economic growth have focused predominantly on the effects of primary and secondary education. This study examines the impact of tertiary education on economic growth.

Our analysis suggests that increasing tertiary education may be important in promoting faster technological catch-up and improving a country's ability to maximize its economic output. Our results show that Sub-Saharan Africa's current production level is about 23 per cent below its production possibility frontier. Our analysis indicates that, given this shortfall, increasing the stock of tertiary education by one year would shift out Africa's production possibility frontier and increase the rate of convergence to that frontier, resulting in a 0.63 percentage point boost to income growth in the first year and an income gain of roughly 3 percent after five years. It should be noted that this estimate is less than earlier estimates by Barro and Sala-i-Martin and by Jenkins. It should also be noted that the boost in the rate of convergence that follows from the additional higher education would diminish as Africa reached the theoretical ceiling.

Technological catch-up still plays an important role in movement toward the production possibility frontier; however, it does not appear to push out the production possibility frontier.

This article challenges the belief that tertiary education has little role in promoting economic growth. Tertiary education may improve technological catch-up and, in doing so, help to maximize Africa's potential to achieve its greatest possible economic growth given current constraints. Investing in tertiary education in Africa may accelerate technological diffusion, which would decrease knowledge gaps and help reduce poverty in the region.

As suggested in the Introduction, higher education will not make a difference in Africa if other barriers to development play a determinative and negative role. Without sensible macroeconomic management, for example, new graduates will be much less likely to find productive work. Good governance is another *sine qua non*. Openness to trade – with provisions to ensure that Africa actually benefits from such openness and with increased cooperation from developed countries – is likely to be key. Debt relief, now at hand for some African countries, may also allow governments to begin programs that take

better advantage of well-educated workers. Higher education creates the potential, but governments and private actors must seize the opportunities.

Postscript: Where to go from here

Many avenues for further research are evident. If new research points to specific actions that African governments can take to strengthen the ability of higher education to enhance economic growth, Africa may benefit substantially. Among the directions such research could take are the following:

- **The cost of expanding higher education.** South Africa has the highest tertiary education enrollment rate in Sub-Saharan Africa. If all other barriers could be overcome, what would it cost to bring the rest of Africa up to this level?⁷⁶
- **Curricular reform.** Few development strategies mention curricular reform as a necessary area of improvement for increased competitiveness within the globalizing economy. Research on existing curricula and their suitability for serving Africa's needs may shed light on new and useful directions that curricula could take. It appears, but is not clearly established, that African universities have not made large efforts to reform their curricula in response to rapidly expanding scientific knowledge and changing economic opportunities.
- **Evaluation of data quality.** To the extent that data on current practices guide the reinvigoration of higher education in Africa and affect the analysis of higher education and economic growth, it is important to know how accurate such data are. Recent work on the reliability of data on primary and secondary education shows that the data sources show severe internal and inter-dataset inconsistencies.⁷⁷ This may well be true for higher education; if so, analyses need to take this fact into account. Researchers could try to verify the accuracy of existing cross-country datasets by comparing them with individual country data emerging from household surveys.

⁷⁶ Similar research is reported in Paul Glewwe and Meng Zhao (2005), "Attaining Universal Primary Completion by 2015: How Much Will It Cost?" and Melissa Binder (2005), "The Cost of Providing Universal Secondary Education in Developing Countries." Both papers were prepared for a project of the American Academy of Arts and Sciences on Universal Basic and Secondary Education.

⁷⁷ DE Bloom (2004): "The State of Global Education: Basic facts and data for measuring progress towards universal basic and secondary education." Paper presented at a workshop at the American Academy of Arts and Sciences, Cambridge. August.

- **Balance among levels of education.** As the World Bank moves toward greater inclusion of higher education in its funding priorities, the question of how to balance funding for different levels of education arises. Research could analyze the effects not only of higher education on economic growth but also, for example, of higher and secondary education taken together. More broadly, studies could seek to determine the best of mix of primary, secondary, and higher education according to the circumstances of different developing countries.
- **Disciplinary focus within tertiary education.** The study on Taiwan cited in this paper suggests that science and engineering courses are the most useful for promoting development. Research could seek to find out whether this is true in a range of developing countries.
- **Focusing on data from developing countries.** Much of the cross-country work on higher education looks at all countries for which there are data. Obviously, developing countries face extremely different challenges than developed ones. Separately and systematically examining the benefits of higher education in poor countries may lead to sharper conclusions than have been reached to date.
- **Case study comparisons.** In higher education, as in other fields of inquiry, case studies can be extremely effective in shedding light on facts and trends that may not leap out from the available data. Studies that compare a country in which significant advances have been made (e.g., Mauritius) with a country or countries that exhibit more common problems (e.g., Ethiopia, Madagascar, Senegal, and Tanzania) may be particularly useful. Along these lines, Box 1 presents a brief comparison of Mauritius and Tanzania. It offers a window onto these countries' efforts to improve and expand higher education and the possible relationship between those efforts and economic growth. Box 2 presents the case of Korea, a country that has made great strides in higher education and has experienced sustained and rapid economic growth.

Table 1. PRSPs AND POLICIES

Countries	Year	Current Situation						Reasons for Higher Education					Targeted Areas of Improvement							Money for Higher Ed.									
		Overcrowding University	Hard to gain acceptance to university	Poor infrastructure	Poor student preparation for university	Tertiary education expensive	Poor management	Poor governance practices	Training to incorporate business practices	Health Education (esp. HIV/AIDS)	Job Development	Reflect regional preferences	Equity for Women	University as a Source to Reduce Poverty	Increase Teacher Training	Increase Vocational and Educational Training	Increase Higher Education Positions	Strengthen research and development	Strengthen and increase postgraduate programs	Professional Education Programs	Strengthen Continuing Education	Increase # of Universities	Improve ICT	Restructure curricula	Private Services	Increase in Money	Decrease in Money	No change	Unknown
Benin	2003	X				X				X					X	X			X										X
Burkina Faso	2000														X	X											X		
Burundi	2004			X				X						X	X								X						X
Cameroon	2003	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Cape Verde	2004		X	X													X												X
Central African Republic	2000														X														X
Chad	2003			X					X					X	X		X												X
Democratic Republic of Congo	2004			X						X				X	X														X
Republic of Congo	2005													X												X			

Countries	Year	Current Situation						Reasons for Higher Education						Targeted Areas of Improvement						Money for Higher Ed.									
		Overcrowding University	Hard to gain acceptance to university	Poor infrastructure	Poor student preparation for university	Tertiary education expensive	Poor management	Poor governance practices	Training to incorporate business practices	Health Education (esp. HIV/AIDS)	Job Development	Reflect regional preferences	Equity for Women	University as a Source to Reduce Poverty	Increase Teacher Training	Increase Vocational and Educational Training	Increase Higher Education Positions	Strengthen research and development	Strengthen and increase postgraduate programs	Professional Education Programs	Strengthen Continuing Education	Increase # of Universities	Improve ICT	Restructure curricula	Private Services	Increase in Money	Decrease in Money	No change	Unknown
Cote d'Ivoire	2002													X	X														X
Djibouti	2004													X	X	X													X
Ethiopia	2002			X			X		X					X	X	X	X	X								X			
Gambia	2002															X													X
Ghana	2003	X	X											X	X		X										X		
Guinea	2002				X			X			X			X		X				X			X			X			X
Guinea-Bissau	2000			X																									X
Kenya	2004							X																			X		
Lesotho	2000														X														X
Madagascar	2003							X						X	X			X											X
Malawi	2002						X		X		X	X		X	X	X	X		X				X			X			
Mali	2003		X	X											X							X					X		
Mauritania	2000	X					X			X	X				X		X					X							
Mozambique	2001				X	X				X	X			X	X	X	X		X							X			
Niger	2002														X														X

Countries	Year	Current Situation						Reasons for Higher Education						Targeted Areas of Improvement						Money for Higher Ed.								
		Overcrowding University	Hard to gain acceptance to university	Poor infrastructure	Poor student preparation for university	Tertiary education expensive	Poor management	Poor governance practices	Training to incorporate business practices	Health Education (esp. HIV/AIDS)	Job Development	Reflect regional preferences	Equity for Women	University as a Source to Reduce Poverty	Increase Teacher Training	Increase Vocational and Educational Training	Increase Higher Education Positions	Strengthen research and development	Strengthen and increase postgraduate programs	Professional Education Programs	Strengthen Continuing Education	Increase # of Universities	Improve ICT	Restructure curricula	Private Services	Increase in Money	Decrease in Money	No change
Rwanda	2002							X		X				X		X												X
Sao Tome and Principe	2002							X		X				X														X
Senegal	2002							X			X			X		X		X										X
Sierra Leone	2001							X									X	X	X									X
Tanzania	2000																											X
Uganda	2000				X			X							X	X												X
Zambia	2002	X	X									X		X	X	X	X					X						

TABLE 2. PANEL GROWTH REGRESSIONS

Coefficient Term	Explanatory Variable	Coefficient Estimates	
		1	2
α	Capital	0.419 (0.076) **	0.404 (0.112) **
β	Labor	0.564 (0.095) **	0.570 (0.167) **
ϕ_s	Total Years of Education	0.085 (0.078)	0.213 (0.123) *
ϕ_h	Life Expectancy	0.032 (0.008) **	0.033 (0.012) **
λ	Technological catch-up	0.126 (0.033) **	0.096 (0.056) *
σ	Tertiary Education Effect on Catch-up	0.006 (0.009)	0.085 (0.050) *
δ_1	Percentage of land area in the tropics	-0.307 (0.125) **	-0.513 (0.288) *
δ_2	Percentage of land within 100 kilometers of the coast	-0.106 (0.155)	-0.446 (0.277)

n=843 observations from 103 countries

* p<0.1, ** p <0.05

Only models with instruments are reported. The first column shows the instruments with lagged variables, while the second column instruments total years of education with literacy, and the tertiary education effect on catch-up with doctors per capita.

TABLE 3. PRODUCTION POSSIBILITY FRONTIER GAP

Region	Productivity Gap
Africa	22.8%
North America	12.6%
South and Central America	19.0%
Europe	15.0%
Asia	14.0%
Australasia	13.6%
World	17.5%

TABLE 4. LEADERS' EDUCATION LEVEL AND COUNTRIES' GROWTH OF PER CAPITA INCOME (CONSTANT US\$) FROM 1985-2000

	N	Mean	SD
Military	16	17.7%	92.6
Primary	1	8.8%	
Secondary	5	36.4%	48.5
Tertiary	18	9.6%	36.0
Professional	9	3.7%	49.4

p>0.1

There is no significant association between the various levels of leaders' training and their countries' economic growth rates. In fact, countries whose leaders have secondary training have higher mean growth rates than those whose leaders have tertiary and professional educational training, but the numbers do not appear to be statistically different.

Appendix A. Poverty Reduction Strategy Paper Summaries

Country	Date Submitted	Strategies and Goals
Benin	March 6, 2003	<p>The goal is to provide equal student opportunity for all, strengthening of the quality of education, strengthening the institutional framework, training for self-employment, regulation of flow rates at all levels, and control of the cost of education.</p> <p>Higher education goals include improving working conditions and student living conditions, and strengthening the quality of higher education and research. The latter includes strengthening tertiary education and promoting research, introducing undergraduate programs and more relevant professional education programs, and helping disadvantaged groups (minorities, low-income families).</p>
Burkina Faso	May 25, 2000	<p>Focus on basic education (increasing primary enrollment, decreasing rural-urban gaps, increasing teacher availability, health education to prevent AIDS).</p> <p>Increase public vocational education from 3,700 to 8,000 students (increase by 116%).</p> <p>Increase higher education by 50%.</p> <p>No money set aside for tertiary education improvements.</p>
Burundi	Jan. 15, 2004 (Interim Report)	<p>Higher education enrollment is constant. Problems exist with a lack of teaching personnel, especially at community colleges. Current gross enrollment rates are 1.7% for higher education, up from 0.9% in 1990.</p> <p>Higher education remains underfunded. Suggests strengthening technical education and university programs. At the higher education level, it is important to ensure that people go to education of high quality, including using private schools.</p> <p>To achieve this, a National Education and Training Plan will be established.</p>

Cameroon	Aug. 12, 2003	<p>Development of education and professional training as a means of escaping poverty. Of those with higher education, only 7.7% were in poverty compared to 50.1% with no education (p. 16).</p> <p>Important to develop vocational, educational, and professional training to facilitate integration into the labor market, and developing partnerships with the private sector. Yet, this sector is undeveloped and a ministry was started in 2002 to address this issue.</p> <p>Improving governance of the entire education system.</p> <p>Need to train and recruit more teachers.</p> <p>Higher education is suffering from a capacity problem. Currently, there are over 71,000 students at the Federal University of Cameroon.</p> <p>There is also a significant slide toward administration instead of teaching and research.</p> <p>University curricula should be streamlined to match employment opportunities and needs and to partner with businesses.</p> <p>Strengthen university information and communication technology.</p> <p>Need to strengthen infrastructure of universities, and increase private sector involvement in capacity development (including restaurants, lodgings and transportation). Budgetary increase from 3.8 to 5.8% of total expenditure for tertiary education.</p> <p>New universities should be created that reflect the region's realities.</p> <p>Strengthen continuing education.</p>
Cape Verde	Sept. 2004	<p>Education severely affects poverty.</p> <p>The education system has problems around secondary and higher education and cannot meet demand.</p> <p>Encourage students to finish secondary or professional education.</p> <p>Promote adult education/training for life.</p> <p>Increase diversification and expand training opportunities abroad.</p>

		<p>Encourage knowledge and research dissemination to build capacity through Science and Technology to address population needs, especially in priority development areas.</p> <p>Reinforce higher education institutions and provide scholarships for higher education.</p>
Central African Republic	Dec. 13, 2000 (interim)	Emphasis on broad access to vocational training. No other comments made on higher education.
Chad	July 17, 2003	<p>To reduce poverty, focus should be on education and vocational training. Educational level is clearly related to poverty. Should also strengthen the health education component.</p> <p>In higher education, the constraints noted include a lack of infrastructure, equipment, material and teachers, and inappropriate subjects being taught.</p> <p>Must strengthen technical education and vocational training centers for skilled workers.</p> <p>Also, suggested use of short courses to supplement skills, especially entrepreneurial skills</p> <p>Strengthen teacher training.</p>
Democratic Republic of Congo	August 2, 2004 (interim)	<p>Rehabilitate infrastructure and equipment in schools, centers of higher education and universities.</p> <p>Establish vocational training, and promoting technical, vocational and scientific skills to ensure adequacy of education with employment and deployment.</p> <p>Strengthen teacher training.</p>
Republic of Congo	February 11, 2005 (interim)	<p>Strengthen teacher training.</p> <p>Decreasing Higher Education and Scientific Research Budget (2100 CFAF billions in 2000 up to 1893 CFAF billions in 2007).</p>
Cote d'Ivoire	Jan. 31, 2002 (interim)	<p>Improve quality of teaching and decentralize higher education.</p> <p>Strengthen vocational training.</p> <p>Reduce drop out rates in universities.</p>

Djibouti	May 25, 2004	<p>Scholarship to provide college education by opening a university in Djibouti or by sending them abroad to less expensive schools in Africa or the Magreb.</p> <p>Planning act calls for established university facilities.</p> <p>Expansion of enrollment, including expanding vocational education.</p> <p>Strengthen teacher training.</p>
Ethiopia	July 31, 2002	<p>Major thrust in program is to increase educational capacity, including health education and primary education.</p> <p>Key to developing national capacity is the focus on formal education like universities and colleges, vocational training institutes, research and consultancy service enterprises and similar institutions.</p> <p>Goal is to increase training to technical and vocational education institutions, especially in business education, and to partner with businesses.</p> <p>There has been a rapid increase in developing new universities. A 108% increase from 1996/1997 to 2000/2001. Goal is to increase undergraduate to 13,000 to 30,000 and postgraduate from 900 to 6,000 to reflect manpower needs in Ethiopia.</p> <p>Goals include opening new degree and diploma programs in fields relevant to economic development, including education, engineering, health and business.</p> <p>Expand postgraduate training capacity – Ph.D & Masters programs.</p> <p>Train university staff and add infrastructure.</p> <p>Expand Agricultural Technical Vocational Education Training.</p> <p>Train managers in higher education.</p> <p>Upgrade colleges to university level.</p> <p>Establish a Higher Education Quality Assurance Agency and a Higher Education Strategy Institute.</p> <p>Called for appropriate vertical correlation of different levels of education to maximize intake capacity and diversity of programs offered.</p> <p>Expansion of training teaching, including through distance education means.</p>

		<p>Dedicated \$395 million for tertiary education and \$274 million for technical and vocational training.⁷⁸</p> <p>The first priority is primary education followed by tertiary education and technical and vocational training.</p>
Gambia	July 10, 2002	<p>Discusses Gambia college as the main tertiary institution.</p> <p>Improve access to higher education.</p> <p>Very little comment otherwise on higher education.</p>
Ghana	Mar. 6, 2003	<p>Suggests developing a special fund for research and development in universities and major science and technology research institutions.</p> <p>Suggests entrepreneurial training at the universities, polytechnics and agricultural colleges.</p> <p>Notes difficulty in gaining university entry at the undergraduate level.</p> <p>Need to link vocational education and training with education of the youth.</p> <p>Strengthen teacher training.</p> <p>Need to redress lack of tertiary education, but decreasing government spending from 13.3 to 10.3.</p>

⁷⁸ Ministry of Finance and Economic Development, Ethiopia (2002): “Sustain Development and Poverty Reduction Program.” Addis Ababa: 96. This was calculated from 15.1 billion Birr at the current exchange rate (May 1, 2005) of 1 Birr = 0.11431 US dollars, and 22.9 per cent for tertiary, and 15.9 per cent for vocational and educational training.

Guinea	July 17, 2002	<p>Poverty is related to women's education and the disadvantage in terms of hours worked owing to the combined total of family and professional activities.</p> <p>3 separate policies: 1) A Technical and Vocational Training Policy Statement (1994); 2) a Higher Education and Scientific Research Development Letter; and 3) a Support Program for the Development of Higher Education (PADES).</p> <p>Getting higher education institutions to have administrative and financial autonomy.</p> <p>The technical and vocational schools are to play a leadership role in poverty reduction.</p> <p>Improving access to technical education for girls.</p> <p>Improving regional technical schools and regional university centers based on the "community college" model.</p> <p>Restructuring university curriculum and training programs including continuing education to meet market requirements and instill entrepreneurial spirit.</p> <p>Strengthening university competitions for placements.</p> <p>Strengthen scientific research.</p> <p>Utilize university studies abroad.</p>
Guinea-Bissau	September 30, 2000 (interim)	<p>Recognized at an incipient stage. There are 3 post-secondary education centers, providing <i>licenciatura</i> programs in medicine, law, and teacher training. Problems with proper textbooks and teaching materials and also with regards to infrastructure facilities, equipment and school-community integration.</p>
Kenya	March 12, 2004	<p>Decrease transfers to universities from 5.4% to 5.0%</p> <p>Links between education training and industry demands.</p> <p>Otherwise, little on tertiary education.</p>
Lesotho	December 31, 2000 (interim)	<p>Focus on technical and vocational training.</p>

Madagascar	Oct. 17, 2003	<p>Not enough technical and professional training exists to match the needs of businesses.</p> <p>Very low levels are giving to professional schools.</p> <p>Strengthen general administration.</p> <p>Put into place doctoral programs.</p> <p>Hire 150 teachers at the university level.</p>
Malawi	August 6, 2002	<p>Low education contributes to poverty. Education is the centerpiece for the poverty reduction strategy (p.49). Also require significant health education around HIV/AIDS.</p> <p>Strengthen technical, entrepreneurial and vocational education and training to provide the population with practical and usable skills to increase income. Approximately 270,000 people leave the education sector and are not in the formal wage sector every year. This implies a role for technical, entrepreneurial and vocational training. Need to promote self-employment through skills development initiatives; improve quality and relevance; rehabilitate infrastructure and equipment, and strengthen management and financing of TEVET.</p> <p>Attention will be paid to secondary and higher levels of education to ensure sustainable national development.</p> <p>Increase access and equity, reserving 30% of university spots for girls. Scholarship schemes for girls and needy students.</p> <p>Improve quality and relevance and provide incentives for research.</p> <p>Increase number of university positions from 3526 to 6824, and to disseminate through distance education.</p> <p>Decrease costs of the provision of higher education from government sources and finding alternative source. This includes decreasing staffing at the university.</p> <p>Strengthen teacher training and professional cadres.</p> <p>Universities will be involved in poverty reduction programs.</p> <p>But no increase in funding to accomplish this (US \$5 million/year⁷⁹).</p>

⁷⁹ Government of Malawi (2002): “Malawi Poverty Reduction Strategy Paper.” Lilongwe: 103. Figure used is 550 Million Kwacha, which equals about \$5 million at the current exchange rate (May 1, 2005) of 1 US dollar = 108.510 Malawi Kwacha.

Mali	Feb. 27, 2003	<p>Problems with university infrastructure.</p> <p>Construct a Technological Institute for Civil Engineering and Mines and for Agriculture.</p> <p>Attempting to start a Vocational Training Consolidation Project – <i>Projet de Consolidation de la Formation Professionnelle (PCFP)</i> and improve technical education to 890,000 pupils.</p> <p>Improving teaching staff.</p> <p>Reduce share of total education budget for higher education should go from 19% in 2000 to 14% in 2003.</p> <p>No other mention of tertiary education policy noted.</p>
Mauritania	Dec. 13, 2000	<p>Large gender disparities exist. Girls are only 3% of technical and vocational training and 15% of higher education.</p> <p>Teacher training required.</p> <p>Research, technology transfers should be emphasized.</p> <p>There is no established national policy for higher education, and led to an overpopulation of students.</p> <p>Many university graduates are unemployed, since vocational training isn't accompanying higher education.</p> <p>Need to strengthen management, operational, and planning capacity.</p> <p>Should emphasize science and technology.</p> <p>Should tailor supply to demand, and use funds more appropriately to match population needs.</p> <p>Build technical training centers responsive to the market's needs.</p>
Mozambique	Oct. 1, 2001	<p>Issues around corruption in the educational system seen in the consultation process.</p> <p>Problem with a deficit in supply of secondary school candidates with pre-university qualifications.</p> <p>Also has a deficit of professional with higher education in all fields. Only 3% of public administration has higher education. Only 752 teachers have a Bachelors qualification. There are only 11,600 students with a population of 16 million.</p>

		<p>Expand equitable access (especially outside Maputo) and improve the quality of the courses taught. Decrease cost of university.</p> <p>Facilitate expansion in investment and promote job creation, though improving technical-vocational training.</p> <p>Higher education can build human capacity, and promote scientific research.</p> <p>Train teachers.</p> <p>Yet, higher education expenditures fall from \$49 million to \$41 million US.</p>
Niger	Jan. 31, 2002	<p>Address primary education (esp. girls' low education levels).</p> <p>Increasing the proportion of enrollments in technical and vocational training schools from 8% of secondary school in 2001 to 20% in 2005 and 50% in 2015.</p> <p>Laying the groundwork for a renovation of higher-level education (p. 62).</p>
Rwanda	July 31, 2002	<p>Emphasis should be placed on technical education and vocational training, and linking it to businesses.</p> <p>Should develop science and technology as related to agriculture and crops and other local problems.</p> <p>Only 0.4% of population has tertiary education, and it targets the wealthy.</p> <p>Role for private institutions such as the Kigali Institute for Science and Technology.</p> <p>Research, consultancy and services relevant to poverty reduction will be strengthened in institutes of higher learning.</p>
Sao Tome and Principe	Dec. 31, 2002	<p>Low level of education by teachers – training teachers.</p> <p>Strengthen agricultural education.</p> <p>Link education, training, and employment systems.</p> <p>No other references to tertiary education.</p>

Senegal	Nov. 20, 2002	<p>Improve quality of university education and research.</p> <p>Create professional training centers in sectors with growth potential.</p> <p>Create training centers aimed at women.</p> <p>Alignment of technical and vocation education to the needs of the national economy.</p>
Sierra Leone	June 30, 2001 (interim)	<p>Improve technical and vocational schools and establish adult training centers.</p> <p>Improve employability of college graduates</p>
Tanzania	October 1, 2000	No mention of tertiary education.
Uganda	March 24, 2000	<p>Enrollment rates in tertiary education remain low. Increase enrollment from 25,000 to 50,000</p> <p>Tertiary education should be extended to help with the framework for economic growth and structural transformation. The cost of including this was not put into the PRSP.</p> <p>Vocational education should help promote income-earning activities. 850 polytechnics and 100,000 trained by 2003.</p>
Zambia	May 16, 2002	<p>Equip and restock university libraries.</p> <p>To increase enrollment to tertiary education, and to increase teacher training at college and universities.</p> <p>Rehabilitate scientific and technological development institutions such as schools of engineering and technology.</p> <p>Very few students graduating from secondary school find places in tertiary institutions due to a severely limited number of institutions.</p> <p>A tertiary level programme that will increase access, improve quality of education, and review curricula to make graduates more relevant and responsive to the changing labour market will be introduced. Programmes will be diversified using various modes of teaching. This is because tertiary level programmes should lead to acquisition and generation of knowledge that will contribute to economic growth and poverty reduction (pp. 80-81).</p>

Appendix B. Higher Education Law – Summary⁸⁰

Country	Higher Education Law	Law in place
Angola	Yes	Management of higher education institutions (Decree No. 3/92) (1991) ⁸¹
Benin	Yes	Document cadre de Politique educative (Law of political education) (Education Act 75-30) (1975) ⁸²
Botswana	Yes	The University of Botswana Act (1982) ⁸³
Burkina Faso	Yes	Université de Ouagadougou (Décret no 91-0346) (1991), Private Education (Décret no AN/VIII-184) (1991), Loi d'Orientation de l'Education (Law of Education Direction) (1996) ⁸⁴
Burundi	Yes	Ministry of Education (Décret no 100/181) (1988), Reorganization of Educational System (Décret-loi no. 1/025) (1989) ⁸⁵
Cameroon	Yes	Universities (Decree 93/026) (1993) Ministry of Education (Decree no 95/041) (1995) Higher Education (Decree 99/0055) (1999) Higher Education (Loi 005) (2001) ⁸⁶
Cape Verde	No ⁸⁷	
Central African Republic	Yes	Université de Bangui (Ordonnance no. 69/0063) (1969) Statutes of the University (Décret no 85/264) (1985) ⁸⁸
Chad	Yes	Université du Tchad (Ordonnance no. 26/PR/71) (1969) Université de N'Djamena (Décret no 32/PR/MENCJS 94) (1994) ⁸⁹
Congo Brazzaville	Yes	University (Ordonnance no. 29/71) (1971) Structure of education system (Loi 25/ 1995) (1995) ⁹⁰
Democratic Republic of Congo	Yes	Higher education and universities (Ordonnance-loi no. 81-028 du 3 octobre 1981) (1981) Academic degrees in technical higher education institutions (Law no 82-004 du 6 février 1982) (1982) ⁹¹

⁸⁰ Note: the primary source for this information is the International Association of Universities, whose website is www.unesco.org/iau/onlinedatabases/index.html

⁸¹ Angola – Education System (www.lmu.edu/globaled/wwcu/background/ao.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2001 (except for Ministry of Education and Culture, updated 2003).

⁸² Benin – Education System (www.lmu.edu/globaled/wwcu/background/bj.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2001 (except for Ministry of Higher Education and Scientific Research, updated 2003).

⁸³ Botswana – Education System (www.lmu.edu/globaled/wwcu/background/bw.rtf). Original source: University of Botswana, Gaborone, 2001.

⁸⁴ Burkina Faso – Education System (www.lmu.edu/globaled/wwcu/background/bf.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2003.

⁸⁵ Burundi – Education System (www.lmu.edu/globaled/wwcu/background/bi.rtf). Original source: Ministère de l'Education nationale, Département de l'Enseignement supérieur, Bujumbura, 2001.

⁸⁶ Cameroon – Education System (www.lmu.edu/globaled/wwcu/background/cm.rtf). Original source: Ministry of Higher Education, Yaoundé, 2003.

⁸⁷ Cape Verde – Education System (www.lmu.edu/globaled/wwcu/background/cv.rtf). Original source: Cape Verde Permanent Delegation to UNESCO, Paris, 2003.

⁸⁸ Central African Republic – Education System (www.lmu.edu/globaled/wwcu/background/cf.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2003.

⁸⁹ Chad – Education System (www.lmu.edu/globaled/wwcu/background/td.rtf). Original source: Commission nationale tchadienne pour l'UNESCO, N'Djamena, updated by the International Association of Universities (IAU) from IBE website.

⁹⁰ Congo – Education System (www.lmu.edu/globaled/wwcu/background/cg.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2003.

Country	Higher Education Law	Law in place
Comoros	No	
Cote d'Ivoire	Yes	Education Law (1995) ⁹²
Djibouti	No	
Equatorial Guinea	No	
Eritrea	No ⁹³	
Ethiopia	Yes	Higher Education Institutions (Proclamation No. 109 of 1977) (1977) Universities of Debub and Bahir Dar (Council of Ministers Regulation) (1999) Administration of Higher Education Institutions in the regions (Council of Ministers Regulation No. 197/1994) (1994) Addis Ababa University (Council of Ministers Regulation No. 113/1993) (1993) Higher Education Institutions (Proclamation No. 109 of 1977) (1977) ⁹⁴ Higher Education Proclamation (2003)
Gabon	No ⁹⁵	
Gambia	Yes	Education Act (1963) ⁹⁶
Ghana	Yes	Higher Education (Act 98, the Education Act Parts IV and V) (1961) Universities and equivalents (NLC Decree 401) (1969) Modifies Education Act of 1961 (PNDC Law 42) (1983) White Paper on Reforms to the Tertiary Education System (1991) ⁹⁷
Guinea	No ⁹⁸	
Guinea-Bissau	Yes	Education Law (1999) ⁹⁹
Kenya	Yes	Universities Act (1985) The Universities (Establishment of Universities) (1989) ¹⁰⁰
Lesotho	Yes	Higher Education Act (2004) ¹⁰¹
Liberia	No ¹⁰²	
Madagascar	Yes	Foundation of universities (Directive 92-030) (1992) Organization of Private Universities (Décret no 95-681) ¹⁰³

⁹¹ Democratic Republic of Congo – Education System (www.lmu.edu/globaled/wwcu/background/zr.rtf).

Original source: International Association of Universities (IAU), updated from IBE website, 2003

⁹² Côte d'Ivoire – Education System (www.lmu.edu/globaled/wwcu/background/ci.rtf). Original source: Ministère de 'Eseignement supérieur, 2003.

⁹³ Eritrea – Education System (www.lmu.edu/globaled/wwcu/background/er.rtf). Original source: University of Asmara, 2001 (except for Ministry of Education updated 2003).

⁹⁴ Ethiopia – Education System (www.lmu.edu/globaled/wwcu/background/et.rtf). Original source: Ministry of Education, Addis Ababa, 2003.

⁹⁵ Gabon – Education System (www.lmu.edu/globaled/wwcu/background/ga.rtf). Original source: International Association of Universities (IAU), 2003.

⁹⁶ Gambia – Education System (www.lmu.edu/globaled/wwcu/background/gm.rtf). Original source: International Association of Universities (IAU), updated from university data, 2001 (except Ministry of Education, updated 2003).

⁹⁷ Ghana – Education System (www.lmu.edu/globaled/wwcu/background/gh.rtf). Original source: National Commission of Tertiary Education, 2003.

⁹⁸ Guinea – Education System (www.lmu.edu/globaled/wwcu/background/gn.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2001.

⁹⁹ Guinea-Bissau (www.bc.edu/bc_org/avp/soe/cihe/inhea/profiles/Guinea_Bissau.htm).

¹⁰⁰ Kenya – Education System (www.lmu.edu/globaled/wwcu/background/ke.rtf) Original source: Commission for Higher Education, Nairobi, 2003.

¹⁰¹ Kingdom of Lesotho, Ministry of Education and Training. National Report on the Education System of Lesotho. (www.ibe.unesco.org/International/ICE47/English/Natreps/reports/lesotho.pdf).

¹⁰² Liberia – Education System (www.lmu.edu/globaled/wwcu/background/lr.rtf). Original source: Liberian National Commission for UNESCO, Monrovia, 2003.

¹⁰³ Madagascar – Education System (www.lmu.edu/globaled/wwcu/background/mg.rtf). Original source: Ministère de l'Enseignement supérieur, Antananarivo, 2001.

Country	Higher Education Law	Law in place
Malawi	Yes	The University of Malawi Act (1963) ¹⁰⁴
Mali	Yes	University (creation of a decentralized and vocational university) (1986) ¹⁰⁵
Mauritania	Yes	Higher education (Loi 70-243) (1970) Status of higher education (Décret 86-212) (1986) Ecoles normales d'instituteurs (Institutional schools) (Décret no 95-035) (1995) ¹⁰⁶
Morocco	Yes	All institutions (Decree 1.59.072) (1959) All institutions (Decree 2.59.0364) (1959) Universities (Dahir portant loi No. 1-75-102) (1975) Organization of Universities (Dahir portant loi No 1-75-87) (1987) Organization of the Doctorate, DESA and DESS and Accreditation of institutions (No. 2-96-796) (1997) Higher education (Projet de loi no. 01-00) (2000) ¹⁰⁷
Mozambique	Yes	Private education (Decree no. 11/90) (1990) Law on Higher Education (Law no. 1/93) (1993) New Law on Higher Education (Law no. 5/2003) (2003) ¹⁰⁸
Namibia	Yes	Higher Education (Act 9) (1985) ¹⁰⁹
Niger	Yes	Reorganization of the Ministry of Education and creation of the Ministry of Higher Education and Research (Decree No. 95-20/PRN) (1995) Organization of the educational system (Loi d'Orientation du Système éducatif) (1998) ¹¹⁰
Nigeria	Yes	Education Amendment Decree (Decree n. 9) (1993) ¹¹¹
Rwanda	Yes.	Organization of Education (Loi organique no 1/ 1985 sur l'Education nationale) (1985) ¹¹² Higher Education Law (2005)
Sao Tome & Principe	Yes	Higher Education (1994)
Senegal	Yes	University (1970) University (1971) Education (loi 91-22 d'Orientation de l'Education nationale) (1991) ¹¹³
Seychelles	No	
Sierra Leone	Yes	University of Sierra Leone Act (1972) ¹¹⁴

¹⁰⁴ Malawi – Education System (www.lmu.edu/globaled/wwcu/background/mw.rtf). Original source: University of Malawi, 2001.

¹⁰⁵ Mali – Education System (www.lmu.edu/globaled/wwcu/background/ml.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2001 (Ministry of Education, updated 2003)

¹⁰⁶ Mauritania – Education System (www.lmu.edu/globaled/wwcu/background/mr.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2003.

¹⁰⁷ Morocco – Education System (www.lmu.edu/globaled/wwcu/background/ma.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2003.

¹⁰⁸ Mozambique – Education System (www.lmu.edu/globaled/wwcu/background/mz.rtf). Original source: International Association of Universities (IAU), updated from EAIE Conference Paper “Development of Higher Education in Mozambique,” 2002.

¹⁰⁹ Namibia – Education System (www.lmu.edu/globaled/wwcu/background/na.rtf). Original source: Ministry of Higher Education, Training and Employment Creation, 2003.

¹¹⁰ Niger – Education System (www.lmu.edu/globaled/wwcu/background/ne.rtf). Original source: International Association of Universities (IAU) from IBE website, 2001 (except for Ministry of Higher Education, updated 2003).

¹¹¹ Nigeria – Education System (www.lmu.edu/globaled/wwcu/background/ng.rtf). Original source: Federal Ministry of Education and National Universities Commission, Abuja, 2003.

¹¹² Rwanda – Education System (www.lmu.edu/globaled/wwcu/background/rw.rtf). Original source: International Association of Universities (IAU), updated from IBE website, 2001.

¹¹³ Senegal – Education System (www.lmu.edu/globaled/wwcu/background/sn.rtf). Original source: International Association of Universities (IAU), 2003.

Country	Higher Education Law	Law in place
Somalia	No ¹¹⁵	
South Africa	Yes	Higher Education Act (1997) ¹¹⁶
Sudan	Yes	Higher Education Act (1991) ¹¹⁷
Swaziland	Yes	University of Swaziland Act (Act No. 2) (1983) ¹¹⁸
Tanzania	Yes	Education Act (1978) ¹¹⁹
Togo	No ¹²⁰	
Uganda	Yes	Universities and other Tertiary Institutions Act (2001) ¹²¹
Western Sahara	No	
Zambia	Yes	Technical Education and Vocational Training Act (1973) The University of Zambia Act (1987) ¹²²
Zimbabwe	Yes	University of Zimbabwe (1990) ¹²³

¹¹⁴ Sierra Leone – Education System (www.lmu.edu/globaled/wwcu/background/sl.rtf). Original source: International Association of Universities (IAU), updated from documentation, 2002.

¹¹⁵ Somalia – Education System (www.lmu.edu/globaled/wwcu/background/so.rtf). Original source: International Association of Universities (IAU), updated from documentation, 2002.

¹¹⁶ South Africa – Education System (www.lmu.edu/globaled/wwcu/background/za.rtf). Original source: South African Universities Vice-Chancellors' Association (SAUVCA), 2001 (except for governing bodies updated 2003).

¹¹⁷ Sudan – Education System (www.lmu.edu/globaled/wwcu/background/sd.rtf). Original source: International Association of Universities (IAU), updated from IBE website (Ministry of Higher Education updated 2003)

¹¹⁸ Swaziland – Education System (www.lmu.edu/globaled/wwcu/background/sz.rtf). Original source: International Association of Universities (IAU), updated from IBE website 2003.

¹¹⁹ The Development of Education 1995–1996. National Report of the United Republic of Tanzania. (www.ibe.unesco.org/International/Databanks/Dossiers/rtanzani.htm#2.2).

¹²⁰ Togo – Education System (www.lmu.edu/globaled/wwcu/background/tg.rtf). Original source: Université de Lomé, 2001.

¹²¹ Uganda – Education System (www.lmu.edu/globaled/wwcu/background/ug.rtf). Original Source: International Association of Universities (IAU).

¹²² Zambia – Education System (www.lmu.edu/globaled/wwcu/background/zm.rtf). Original Source: University of Zambia, Lusaka, updated by the International Association of Universities (IAU) from IBE website (except for governing bodies, updated 2003).

¹²³ Zimbabwe – Education System (www.lmu.edu/globaled/wwcu/background/zw.rtf). Original Source: National Council for Higher Education, Harare, 2001 (except for Ministry of Higher and Tertiary Education, updated 2003).

Appendix C. Higher Education Law – Status

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
Angola	<p>Yes- but not stable. In 1995, extensive legislation was approved, conferring full autonomy to the university, which ceased to be institutionally subjected to orders from the MPLA or the Ministry of Education. After independence, education—from the elementary to the higher level— became free of charge, and expanded considerably. Soon after the transition to the Second Republic, the decision was taken to replace this system by permitting and even fostering the establishment of private institutions of higher education, directly or indirectly fuelled by the state. In Angola today, there are no BA programs (<i>bacharelatos</i>), only MA programs (<i>licenciaturas</i>), which last four to five years. The structure also provides for <i>mestrados</i>, or post-MA programs leading to an academic degree (<i>mestre</i>) in its own right, which is at the same time a step toward the PhD (MD, etc.) degree. However, there are no post-MA programs functioning in Angola.</p> <p>Management of higher education institutions (Decree No. 3/92) (1991)</p>
Benin	<p>Yes. The presidential decree that established and organized the university and higher education in Benin in 1970 was amended by another decree signed in 1973. The university and higher education fall under the responsibility of the Ministry of National Education, while the rector leads the University.</p> <p>The history of governance of the university system has been closely related to the evolution of the country's political situation. The appointment of the senior management of the university (the rector and his deputy, the general secretary, and the deans and heads of specialized institutions) was the exclusive prerogative of the government.</p> <p>Document cadre de Politique educative (Law of political education) (Education Act 75-30) (1975)</p>
Botswana	<p>Yes. Universities have been funded by various governments yet no legal reforms for higher education have been implemented.</p> <p>The University of Botswana Act (1982)</p>
Burkina Faso	<p>Yes. Higher education in Burkina Faso dates back to April 24, 1961, with the signature of a cooperation agreement with France. The Institute for Teacher Training (CPES) was created on October 20, 1965 with an aim to provide training for first-cycle secondary teachers.</p> <p>CPES, the first university structure, later became the Higher Education Training Center of Ouagadougou (CESup), endowed with separate legal status and financial autonomy. At that time, CESup was made up of all the higher education and research structures of the country, including the University College of Humanities, the University Educational Institute, the University Institute of Technology (IUT), the Upper Volta Center for Scientific Research (CVRS), and the Center for Documentation and Educational Development. The CVRS was withdrawn from the CESup on September 25, 1972. CESup was renamed the University of Ouagadougou (UO).</p> <p>Since its inception, the University of Ouagadougou has undergone two periods of reform, in 1985 and 1991. The significant outcome of the 1985 reforms was the multiplication of institutes and schools within the university. In 1991, these institutions were grouped into schools, with the objective of increasing the usefulness and the performance of UO in light of national realities. Ultimately, though, these structures were once again decentralized in 1995-96. In 1996, Burkina Faso adopted a Strategic Plan for Scientific Research (PSRS) that set out the essential needs for the social development of the country and the well-being of the population. The state-owned universities have a budget mainly based on subsidies from the state, but public funds are insufficient to cover all of their operating expenses.</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>Université de Ouagadougou (Décret no 91-0346 (1991)), Private Education (Décret no AN/VIII-184 (1991)), Loi d'Orientation de l'Éducation (Law of Education Direction) (1996)</p>
Burundi	<p>Yes. At the beginning of the 1960s, higher education in Burundi was composed of three institutions: the Institute of Agriculture of Ruanda-Urundi, the <i>institut facultaire of Usumbura</i> (University institute of Usumbura), and the Faculty of Science of Usumbura. In 1964, these three institutions merged to create the official University of Bujumbura, known as the <i>Université officielle de Bujumbura</i> (UOB). At the beginning of 1980s, four other non-university higher education institutions were created to train the technical staff required by the civil service. This includes the School of Journalism, the School of Commerce, the Institute of Town Planning and Development, and the Institute of Agriculture.</p> <p>In 1989, these institutions were integrated into the University of Burundi. The major objective of this integration was to optimize the use of the resources allocated to higher education.</p> <p>Ministry of Education (Décret no 100/181) (1988), Reorganization of Educational System (Décret-loi no. 1/025) (1989)</p>
Cameroon	<p>No. Subsidies from the state and contributions from the French government were the main sources of funding for the Federal University. No tuition fees were charged; and students paid only a very small registration fee, which constituted a negligible proportion of the budget. Legislation introduced in 1967 made the chancellor of the university, who was also the minister of national education, the executive head of the university, with responsibility for its administrative and financial management, as well as the recruitment of teaching staff. Up to 1973, the French government designated the executive and academic head of the university. The minister of national education retained supervisory authority over the university. This lack of autonomy has been a problem.</p> <p>Universities (Decree 93/026) (1993) Higher Education (Decree 99/0055) (1999) Ministry of Education (Decree no 95/041) (1995) Higher Education (Loi 005) (2001)</p>
Cape Verde	<p>No. Higher education is mainly provided by the Universidade Jean Piaget de Cabo Verde and higher institutes.</p>
Central African Republic	<p>Yes. During independence in 1960, the country had no single university. Central African students expatriated, particularly to France, to obtain degrees in higher education institutions. In the early 1960s, the country shared with Gabon, Chad, and the Republic of Congo, a common post-secondary institution: the Foundation for Higher Education in Central Africa (FESAC), created by France to provide a regional training infrastructure for people of the former colonies of the French Equatorial Africa. CAR hosted the Agriculture Institute, while secondary schools teachers received their training at the School of Education in Brazzaville, Republic of Congo.</p> <p>Statutes of the University (Décret no 85/264 (1985)) Université de Bangui (Ordonnance no. 69/0063 (1969))</p>
Chad	<p>Yes. Very low levels of higher education.</p> <p>Université de N'Djamena (Décret no 32/PR/MENCJS 94) (1994)) Université du Tchad (Ordonnance no. 26/PR/71 (1969))</p>
Congo Brazzaville	<p>Yes, but only for private colleges and universities. In September 1990, a law authorized the private sector to operate educational institutions. At that time Marien Ngouabi University was the only post-secondary institution.</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>Private institutions are providing mainly technical and professional training in such subjects as business management, and office and computer skills. Congolese higher education was born under the colonial administration with the establishment of a basic structure between 1958 and 1960 for a higher education system throughout French Central Africa (<i>Afrique Centrale Francaise</i>, AEF). 1958 saw the creation of the Institute for Advanced Studies, followed in 1959 by the Center for Advanced Administrative and Technical Studies (<i>Centre d'Etudes Administratives et Techniques Superieures</i>, CEATS). The latter comprised a literary major, a scientific major, and a training school for high school teachers. 1960 marked the creation of the Central African Foundation for Higher Education (<i>Fondation de l'Enseignement Supérieur en Afrique Centrale</i>, FESAC). Part of this network was the Higher Education Center in Brazzaville (<i>Centre d'Enseignement Supérieur de Brazzaville</i>, CESB), comprised of the Law School, the Advanced School of Science, the Advanced School of Humanities, and the Medico-social Department.</p> <p>The FESAC finally crumbled in 1971, under the pressing need of the newly established states to confirm their individual sovereignty, and also due to Congo's revolutionary policy. Congo inaugurated the University of Brazzaville in 1971. During the period between 1971 and 1983, the University of Brazzaville entered a period of restructuring; a number of institutions came to light, such as the Advanced School of for the Sciences of Education (<i>Institut Supérieur des Sciences de l'Education</i>, INSSSED), which replaced the former ENSAC.</p> <p>By 1977, the University of Brazzaville was renamed Marien Ngouabi University.</p> <p>Structure of education system (Loi 25/ 1995) (1995); University (Ordonnance no. 29/71) (1971)</p>
Democratic Republic of Congo	<p>Yes. The consecutive economic crises the country endured resulted in the disengagement of the state from higher education. Education appropriations dwindled from 24.2% in 1980 (7.4% for higher education) to 7.9% in 1988 (1.5% for higher education). During the "political transition" period, the ministry in charge of higher education created many university centers, public advanced technical and pedagogical institutes as a step toward the "redistribution" of institutions throughout the country. Major historical events in Congolese higher education begins in 1954 with the inauguration of the Lovanium University in Kinshasa through the period of the <i>Etats Généraux de l'Education</i> in January 1996.</p>
Comoros	<p>No. Postsecondary education in Comoros is public and limited to a number of programs in teacher training, agriculture, health sciences a business school, and with an overall capacity of 200 students. Enrollment ratios at the primary, secondary, and postsecondary levels are estimated at 64%, 11% and 2%, respectively.</p> <p>Postsecondary education is offered at the Official School (<i>l'Ecole Officielle</i>) based on the French education model.</p>
Cote D'Ivoire	<p>No. The first Higher Education Center was created in 1958 under a French government decree and reached full university status in 1964. Now there are three universities in Côte d'Ivoire, as well as many research centers and schools. Ninety five percent of the higher education budget comes from the government.</p> <p>Education Law (1995)</p>
Djibouti	No law.
Equatorial Guinea	No.
Eritrea	<p>No. The University of Asmara was founded in 1958. Originally named the Holy Family University Institute by the Camboni Sisters Missionary Congregation, the institute's original goal was to prepare students for university study in Italy. Accredited by the Superior Council of the Institute of Italian Universities in 1960, the institution officially changed its name to the University of Asmara in 1964.</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
Ethiopia	<p>Yes. Modern higher education began with the founding of the University College of Addis Ababa on March 20, 1950. The University College had less than 1,000 students and less than 50 teachers in the late 1950s. Today the system includes 8 established universities, 13 newly created universities, and a number of private institutions with a total system enrollment of 147,000. Higher education in Ethiopia has been financed mainly by the government. The funds for the capital and recurrent expenses are provided to institutions through the Ministry of Finance. About 12% of the education budget is set aside for higher education. Out of the recurrent budget, about 50% is allocated for salaries. The Higher Education Proclamation of 2003 introduces greater autonomy, formula funding, a graduate tax, a Quality and Relevance Assurance Agency and a Higher Education Strategy Center. Subsequently, 13 new universities have been created.</p> <p>Universities of Dehub and Bahir Dar (Council of Ministers Regulation) (1999) Administration of Higher Education Institutions in the regions (Council of Ministers Regulation No. 197/1994) (1994) Addis Ababa University (Council of Ministers Regulation No. 113/1993) (1993) Higher Education Institutions (Proclamation No. 109 of 1977) (1977) Higher Education Proclamation (2003)</p>
Gabon	<p>No. The history of higher education in Gabon is connected to the founding of the Central African Higher Education Foundation issued by the conference of the heads of states of the former French African Equatorial Federation on December 12, 1961. The conference adopted the charter for the organization of higher education in Central Africa. Gabon hosted the Polytechnic Institute and a law school in Libreville. Scattered over many countries, this university network did not survive the independence movements that gave birth to national universities in each country that achieved independence from French colonialism. The main funding source of Gabonese higher education is the state. The state finances up to 95% of the cost of each student. A generous financial aid system, which consumes up to 40% of the allocated budget, provides scholarships, room and board, and medical care. Fees collected from students represent only about 3% of the total budget.</p>
Gambia	<p>Yes. Higher education was reserved mainly for rulers and priests, and the selection process was elaborate.</p> <p>The provision of higher education from a Western perspective was never the intention of the British colonial government and it is clear that higher education was not one of its priorities. As a result, when independence came, newly independent countries such as Gambia did not have any higher education policy or infrastructure upon which to build.</p> <p>Higher education in Gambia is very different from higher education in most African countries because no system of higher education existed in Gambia until 1995. The main post-secondary institutions of learning in Gambia are the Gambia College and the Gambia Technical Training Institute.</p> <p>Education Act (1963)</p>
Ghana	<p>Yes. By 1924, Achimota College established in the Gold Coast (now Ghana) offering first-year university courses in engineering. The University College of the Gold Coast was established in 1948, and formed a special relationship with the University of London. In 1961, the University College attained sovereign university status with powers to award its own degrees. Tertiary institutions in Ghana have a two-tier or bicameral system of governance. They have councils vested with overall responsibility for matters.</p> <p>Higher Education (Act 98, the Education Act Parts IV and V) (1961) Universities and equivalents (NLC Decree 401) (1969) Modifies Education Act of 1961 (PNDC Law 42) (1983) White Paper on Reforms to the Tertiary Education System (1991)</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
Guinea	<p>No. Currently, the higher education system of Guinea consists of two universities-- University of Conakry and the University of Kankan--and three professional institutes, which have been annexed to the universities (the Institute of Education, the Institute of Agronomy and Veterinary Sciences, and the Institute of Mining and Geology). Up until 1986, all institutions were controlled and managed by the central government. Reforms initiated by the government conferred great autonomy to public institutions even though the state continues to be their principal funding entity. Appropriate procedures have been put in place to ensure more autonomy to public institutions while participatory governance is encouraged within the institutions.</p> <p>Two administrative bodies manage the implementation of the national policy in matters of higher education: The Department for Scientific and Technical Research and The Department for Higher Education. These organs are responsible for ensuring the coordination, evaluation, and follow-up of the sub-sector.</p>
Guinea Bissau	<p>Yes. In 1999, the Government of National Unity issued a decree that placed all existing centers and every activity related to education and training under the coordination of the Ministry of Education. This is a landmark decision in the evolution of post-secondary education. In the same year, a steering committee for the creation of a national university was set up in the country at the National Institute for Research (INEP). The first attempt to create a post-secondary education system in Guinea Bissau was initiated by the Ministry of Justice in 1979 with the establishment of a law school to train professionals for the administration of justice. A few years later, a school of education was established for training secondary school teachers.</p> <p>Education Law (1999)</p>
Kenya	<p>Yes. The first Kenyan higher educational institution was The Royal Technical College of East Africa, opened in Nairobi in 1956. In 1961, the Royal Technical College was renamed the Royal College of Nairobi and turned into a university college. In 1963, when Kenya attained its independence, the Royal College became the University College of Nairobi. In 1970, the University College of Nairobi was renamed the University of Nairobi. Kenya has 6 public and 13 private universities with an enrollment of about 50,000 students. Roughly 80% are enrolled in public universities, while 20% of the total university student population attends private universities.</p> <p>More than 60,000 students enroll in middle-level colleges. The middle-level colleges cater to a variety of post-secondary career courses leading to certificate, diploma, and higher diploma awards. By 1990, Kenya had about 160 middle-level colleges; by 2000 it is estimated that the country had more than 250 of them.</p> <p>Universities Act (1985) The Universities (Establishment of Universities) (1989)</p>
Lesotho	<p>No. Lesotho has seen a significant growth of tertiary higher education in the recent years. Most of them are distance education institutions based mainly in South Africa. Currently enrollment in these institutions stands at around 700. Historically, the National University of Lesotho (NUL) was the first university born out of the small Catholic University College (later known as Pius XII University College), which was founded in April 1945 by the Roman Catholic Hierarchy of Southern Africa. Overall university enrollments during the academic year 1999-2000, stood at well over 2,800 students.</p> <p>Higher Education Act (2004)</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
Liberia	<p>No. Higher education in Liberia is decentralized. Each institution of higher education is autonomous and operates under a charter provided by the state. A board of trustees provided for under the charter governs each institution. The minister of education represents the state on each board, but has no veto power. From 1862 to the mid-1980s, higher education in Liberia centered around three institutions: Liberia College, precursor to the University of Liberia; By the close of 1989, when war broke out, enrollment in all the universities, colleges, and training institutes totaled close to 10,000 with about 7,000 enrolled at UL and Cuttington, and the rest spread among the technical and rural training institutes. By 1999, enrollment at UL had swollen to 10,000, even though most programs were operating at less than their pre-war capacity, due to shortage of faculty and lack of laboratory equipment and space. Cuttington has not reached its pre-war enrollment of more than 1,000, and most of the other colleges and institutes are closed.</p>
Madagascar	<p>Yes. Advanced education during the colonial period included the religious seminaries, the Colonial Professional College, and the Medical School of BÉfalanana. During the Second World War, Malagasies organized courses in law and established the Law Examinations Center. After the liberation of France in 1948, and was transformed into the College of Law (1955). Companion institutions of science (1954-57) and letters (1959) were also formed during this period.</p> <p>On June 26, 1960, independence returned to Madagascar, and one year after independence, the first true university was formally organized by merging the independent faculties of law, letters, and science and technology with the formerly independent medical school. The university enrolled 1,130 students during its first year.</p> <p>Tertiary enrollment accounts for 2.5% of traditional college-aged students, but is unevenly divided across the country. All faculty are appointed and promoted by the Ministry of Higher Education. The ministry, rather than academic officers, sets salaries and working conditions. Faculty members have strong ties to politics and the political system. While the teaching corps increased during the 1990s, the number of administrative staff shrank by 5%. The student-to-administrator ratio (6:1) remains high relative to other countries. MINESUP appoints a rector who governs each university with two constituent councils, one for administration and the other for academic affairs. The administrative council works with the rector to examine and approve the university's budget, fix the rules and regulations of the institution, and to ensure the efficient conduct of business affairs. Together with the academic council and the rector, it works to define the principal activities of the university, plan for the education and training of faculty, and rule on proposals for new academic programs. The academic affairs council concerns itself primarily with issues of pedagogy and research.</p> <p>Foundation of universities (Directive 92-030) (1992) Organization of Private Universities (Décret no 95-681)</p>
Malawi	<p>Yes. Following a recommendation of the American Council on Education in 1963, Malawi's parliament passed the University of Malawi Act in October that year. Teaching at the new university started on the Chichiri campus in September 1965 (UNIMA). University education in Malawi is extremely competitive due to the very limited places offered to qualifying students each year. Tertiary education admits a very small proportion of the eligible school population. Only a total of about 1,000 places are offered every year at the 5 constituent colleges of the UNIMA, for example. The 7,500 places available in all tertiary institutions only represented a mere 0.3% of the total number of students enrolled at all levels of education. The actual Gross Enrollment Ratio (GER) has stagnated at 0.5% of the appropriate age group.</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>The competition for dwindling resources has intensified by the opening of the Mzuzu University. The financial crisis facing the higher education sector manifests itself in the declining relevance and quality of education and research. Malawi's decision to share the costs of higher education with the students was made in 1985 in response to the World Bank's conditionality for an education credit.</p> <p>The University of Malawi Act (1963)</p>
Mali	<p>Yes. After achieving independence from France in 1960, Mali embarked on a series of educational reforms that continue to date. From 1962 -1968, the first government of independent Mali embarked on a massive schooling campaign at all educational levels. More schools were built to bring education to the general population at the primary and secondary levels. At the tertiary level, specialized schools of higher education were established. They included the National School of Engineering (ENI); the Ecole Normale Supérieure (ENSup), for the training of high school teachers and other professionals; the National School of Administration (ENA); the School of Medicine and pharmacy; and the Rural Polytechnic Institute (IPR).</p> <p>University (creation of a decentralized and vocational university) (1986)</p>
Mauritania	<p>Yes. Mauritanian higher education was launched with the National School for Administration (<i>Ecole Nationale d'Administration, ENA</i>), in 1966. Two other institutions--the Advanced Institute for Islamic Studies and Research (<i>Institut Supérieur d'Etudes et de Recherche Islamiques, ISERI</i>), and the Advanced Center for Technical Education (<i>Centre Supérieur d'Enseignement Technique, CSET</i>) were established in 1979 and in 1980 respectively. The government created Nouakchott University (NU) in 1981 and has two schools: the School of Law and Economics and the School of Letters and Humanities. In 1986, the Advanced Scientific Institute (<i>Institut Supérieur Scientifique, ISS</i>) was created to host science majors.</p> <p>The ENA became the School for Technical Sciences in 1995 (<i>Faculté des Sciences Techniques, FST</i>). Other institutions include the Mauritanian Institute for Scientific Research in 1974, the Institute for Arab and Islamic Sciences in 1979, and the National Institute for Special Medical Studies in 1997.</p> <p>The student population increased significantly from 1990 through 2000. Holders of <i>baccalauréat</i> degrees increased from 1,737 to 3,137 from 1990 to 1998. Students are concentrated mainly in the disciplines of law, economics, and literature. In 1999-2000, students in law and economics accounted for 59.5% of the total number of registered students, while students majoring in science and technology represented only 10% of the student body. Mauritanian higher education is public and free. Students are only expected to pay a \$2.50 registration fee. The government subsidy is the main source of internal financing in terms of operational costs.</p> <p>Higher education (Loi 70-243) (1970) Status of higher education (Décret 86-212) (1986) Ecoles normales d'instituteurs (Décret no 95-035) (1995)</p>
Mauritius	<p>Yes. Established in 1965 as the College of Agriculture, University of Mauritius (UM) is the single largest local tertiary education provider. Initially established with 3 schools in the areas of agriculture, administration and industrial technology, the university has today expanded to comprise 5 faculties, namely agriculture, engineering, law and management, science, and social studies and humanities. Furthermore, five centers have been created, the Center for Medical Research and Studies, the Center for Distance Learning, the Center for Information Technology and Systems, a Consultancy Center, and the recently established Center for Applied Social Research (a joint initiative of UM and the Mauritius Research Council).</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
Mozambique	<p>Yes. Up until 1999, the Ministry of Education supervised higher education institutions through the National Council for Higher Education, chaired by the minister of education. In early 2000, a new Ministry of Higher Education, Science, and Technology (MESCT) was established to supervise the whole system of higher education in the country. Despite the creation of the MESCT, higher education institutions have enjoyed autonomy since the enactment of the Higher Education Law 1/93. This law established the National Council for Higher Education (CNES), an advisory body comprising rectors of all functioning public and private HEIs.</p> <p>Although the Law on Higher Education states that HEIs are autonomous, the precise degree of autonomy has often been a matter of dispute. In the case of UEM, the level of financial autonomy was increased through an agreement between the government and the university in December 1999. In many other aspects, the autonomy of HEIs is limited, though the overall academic autonomy of public HEIs is guaranteed by law.</p> <p>Higher education in Mozambique was initially established by the Portuguese in 1962, when the General University Studies of Mozambique (EGUM) were introduced. Nine programs (courses) were then offered.</p> <p>In 1968, the EGUM were upgraded to form a university that came to be known as the University of Lourenço Marques (ULM). This university remained discriminatory against black Mozambicans. The political independence of Mozambique in 1975 marked an end to the discriminatory nature of ULM. In 1976, ULM was changed into Eduardo Mondlane University (UEM) and became the first national university of Mozambique. When UEM was established in 1976, it had a student population of 2,400 students. These numbers dropped drastically from 1977 onwards, stabilizing in 1989 when 1974-75 figures were reached again, then growing subsequently from 1990 onwards.</p> <p>Private education (Decree no. 11/90) (1990) Law on Higher Education (Law no. 1/93) (1993) New Law on Higher Education (Law no. 5/2003) (2003)</p>
Namibia	<p>Yes. In 1980, the Academy for Tertiary Education was established, with courses being offered mainly in teacher and secretarial training. Students had to travel abroad for further studies prior to 1980. Act 9 of 1985 reconfigured the academy to comprise a university component (which continued to be responsible for teacher training), Technikon of Nabia, and the College for Out-of-School Training. Shortly after independence, the 3 components were divided into 2 independent tertiary institutions.</p> <p>A presidential commission was set up and submitted a report on tertiary education in 1993. The recommendations of the commission led to the establishment of various tertiary institutions in Namibia, including the Polytechnic, the Colleges of Education, and University of Namibia (UNAM). UNAM is the only university in the country.</p> <p>The key source of funding for UNAM is the government. There is the hope that the government will step up, rather than scale down, the budgetary allocation to UNAM. Regardless, the university will endeavor to raise additional funds from external sources, such as the private sector and the international donor community. The university is also striving to promote cost-effectiveness, rational budgeting, efficient administration, accountability, and a sound culture of maintenance and control of its assets.</p>
Niger	<p>Yes. The Niamey Higher Education Center (Centre d'Enseignement Supérieur, CES), which was created in 1971, became a university in 1973. In 1985, however, a major development occurred with the advanced schools becoming full-fledged schools of the university, and in 1993 Niamey University changed its name to Abdou Moumouni University (AMU). Student</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>enrollment in Niger underwent significant increases with the creation of the higher education center in 1971, and its conversion into a university in 1973. This meant that high school graduates were no longer obliged to leave for countries of the sub-region to resume their university studies.</p> <p>Reorganization of the Ministry of Education and creation of the Ministry of Higher Education and Research (Decree No. 95-20/PRN) (1995) Organization of the educational system (Loi d'Orientation du Système éducatif) (1998)</p>
Nigeria	<p>Yes. Federal and state governments are the main proprietors of higher educational institutions. In 1977, the federal government abolished the payment of tuition fees for all undergraduate programs in its universities and set the hostel accommodation fee. These 2 policies have remained in force through the present day. The origins of Nigerian higher education go back to 1934 when the colonial government set up the Yaba Higher College. In 1959, the Nigerian government commissioned an inquiry to advise it on the higher education needs of the new nation for its first two decades. Before the submission of the report, the Eastern Region government established its own University at Nsukka. In 1962, the federal government established a new university in the then-capital city of Lagos and that same year the Northern Region government established a new university. The Western Region government which already had 2 Federal universities in its territory, went ahead and established its own university at Ile-Ife, in 1962.</p> <p>In 1970, the newest of the 4 regions (which had now been rearranged into 12 states) opted to have a university of its own, which is now known as the University of Benin. Its establishment marked the end of the first phase of university development in Nigeria. The 6 universities established during the period 1960-1970 are still referred to as first-generation universities.</p> <p>The government established 7 new universities from 1975-1977 and also took over the 4 regional universities in 1975. The plan period also witnessed the establishment of at least 16 new state-owned and federal polytechnics.</p> <p>The period 1979-1983 also witnessed the emergence of 7 state universities, 5 new federal universities of technology, and 2 new federal universities of agriculture. In 1984, a new military government felt compelled to rationalize this expansion of the system by downgrading 2 of the universities of technology and the 2 universities of agriculture to campuses of older universities. It took another military government 4 more years to restore these universities to full autonomy. Although all the regional universities had been taken over by the federal government by 1975, states began to establish new universities of their own. The trend is still continuing. As of August 2001, Nigeria had 45 universities of which 25 were federal (including one defense academy), 16 were state and four were private universities.</p> <p>Education Amendment Decree (Decree n. 9) (1993)</p>
Rwanda	<p>Yes. The Catholic Church was the first institution to undertake formal education in Rwanda in 1914. It was not until 1963 that the state established the National University of Rwanda (NUR). Since that time, the combined efforts of church, state, and the private sector have yielded 11 more institutions of higher education. Six of the 12 higher education institutions were started by the government; four were started by religious foundations; two institutions were started by secular establishments. From an initial enrolment of 49 students in 1963-64, NUR achieved an enrollment of 921 in 1980-81 and rose to 1,572 in 1985-86 and currently stands at 4,550. The rest of the institutions enrolled 4,970 students collectively in 1999-2000. The total student population in all 12 institutions is barely 10,000, only one-fourth of whom are females. In 2005, Parliament passed a new Higher Education Law that establishes a</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>comprehensive strategic framework for the sub-sector. The Law sets out the governance, function, role, form and shape of the higher education system and calls for formula funding and greater efficiencies to reduce unit costs.</p> <p>Organization of Education (Loi organique no 1/ 1985 sur l'Education nationale) (1985) Higher Education Law (2005)</p>
Sao Tome and Principe	<p>Yes. The pre-independence absence of higher education in Sao Tome and Principe continued until 1994. The Ministry of Education established two institutions of higher learning in Sao Tome and Principe. The first one, created in 1994, is private and the second one, established in 1997, is public.</p> <p>Higher Education (1994)</p>
Senegal	<p>No. The Dakar University, created on February 24, 1957, had an enrollment of 575 students. In 1968, with the creation of the Polytechnic Institute, the total number of students increased to 3,000. In 1981, the university reached the maximum capacity of 13,000 students. By 1994, the number of students grew to more than 25,000, students while the number of research professors increased to 1,000. Cheikh Anta Diop (Université Cheikh Anta Diop de Dakar, UCAD), Gaston Berger (Université Gaston Berger, UGB), Advanced National Professional Schools, and private institutes constitute higher education institutions in Senegal. Public higher education in Senegal benefits from a subsidy system, which until recently provided for 96% of the institutions' budgets. In 1997, the budget allocated to education and training was estimated at more than 93.3 billion francs or 33% of the government's budget, with 24.7% allocated to higher education (7% of the total budget).</p> <p>University (1970) University (1971) Education (loi 91-22 d'Orientation de l'Education nationale) (1991)</p>
Seychelles	<p>No. Seychelles does not have a higher education system. Seychelles Polytechnic, however, is a postsecondary institution, which is largely funded by the Chinese government. The government expenditure on education was estimated at US \$ 29.3 million in 1998. Seychelles partners in education include, among others, UNICEF, UNESCO, and African Development Bank.</p>
Sierra Leone	<p>Yes. University education in Sierra Leone originated as the Christian Institute in 1814. It later became a teacher's college, Fourah Bay College (FBC), when it moved to the east end of Freetown in 1827. Founded by the Church Missionary Society of Britain, the college became affiliated with Durham University in England in 1876, and started preparing students for degrees. The first degrees were awarded in 1879. The origin of Njala University College (NUC) can be traced back to 1912, when the government set up an agricultural department plantation and the college was upgraded to a university college in 1964; and in 1967 it joined Fourah Bay College to constitute the University of Sierra Leone. In 1988–89, the College of Medicine and Allied Health Sciences (COMAHS) was added as a third college. The teacher training department of FBC was transferred to Tower Hill in Freetown in 1960, and was later renamed Milton Margai Teachers College (MMTC). In 1996, MMTC became an affiliate of the university and was renamed the Milton Margai College of Education.</p> <p>Professional schools, such as the School of Nursing, the Hotel and Tourism Training Center, the Institute of Library, Archive, and Information Science, Institute of Public Administration and Management (IPAM), and the law school were established in the 1980s as tertiary institutions. More than 90% of the funds for tertiary institutions come from the government. Additional funds come from school fees and donations from donor agencies. Private tertiary institutions rely on generating funds from school fees rather than from donor agencies.</p> <p>University of Sierra Leone Act (1972)</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
Somalia	<p>No functioning state. Higher education in Somalia began in 1954 when the Italian government established the Institutes of Law, Economics, and Social Studies. These institutes were satellites of the University of Rome, which provided all the instruction material, faculty, and administration. In 1964, the institutes offered two years of study in Somalia, followed by two years of study in Italy. After a military coup in 1969, all foreign entities were nationalized, including the university, which was renamed Jaamacada Ummadda Soomaliyeed (the National University of Somalia, or NUS). A major devastating impact of the civil war in Somalia was the destruction of the Somali National University (SNU) and other institutions that offered post-secondary education. Before the collapse of the Somali state, SNU enrolled 15,672 students, had a staff and faculty of about 6,000, and consisted of 13 faculties.</p> <p>On September 22, 1997, Mogadishu University (MU) in Somalia became a recognized private university in the absence of a functioning government in Mogadishu. MU's financial support comes from three sources: student tuition, a trust fund, and donations. Students are required to be fluent in English and Arabic as a criterion for admission. 318 students were enrolled at MU.</p> <p>Higher Education in Somaliland consists chiefly of Amoud University (AU) and Hargeisa University (HU). There were only 12 faculty members for the academic year 1999-2000. A total of 103 students enrolled in the same year at AU.</p> <p>Higher education became available in Somalia through NUS and its six colleges. There were also seven specialized post-secondary schools, all of which were government-sponsored. Although various institutions offered instruction in Italian, English, and Arabic, the main language of instruction at NUS was Italian.</p>
South Africa	<p>Yes. Between 1916 and the late 1980s, a system of 36 higher education institutions, comprising 21 universities and 15 technikons with approximately 550,000 students evolved. South African higher education is financed principally by government subsidy and fee recovery, augmented by private and government contracts, donor and alumni support, and investments. Government allocations to higher education increased by an average annual increase of 5% from 1995-99. The proportion allocated to technikons has increased slowly but steadily. noteworthy recent development in higher education has been the very rapid growth of the private sector. A rapid proliferation of both local and international providers and suppliers has occurred, mainly from the United Kingdom, the United States, and Australia. This has been matched by growing local demand for the perceived better quality and more flexible market-oriented programs, especially those designed for non-traditional students. While some of the providers are long-established and reputable local and foreign institutions, a number of local "fly-by-night" institutions recently came to light and were prominently featured in the local press. Enrollments have risen steadily from 473,000 in 1993 to 564,000 in 1999, an overall increase of about 28% and an average annual increase of 6%. Between 1993-98, headcounts grew more rapidly in technikons (56%) than in universities (17%). Enrollments peaked at 605,000 in 1998 and then decreased by about 40,000 (7%) by 1999.</p> <p>It is clear that the decline in enrollments was most evident in HBUs (where it involved mainly African students) and in the distance education institutions (UNISA and Technikon South Africa). Enrollments in HBUs peaked in 1995 to reach 29% of total university enrollments, and since then declined steadily to 21% in 1999. An especially sharp drop of 20,000 headcount enrollments occurred between 1997-99, with a fall of 13,000 (14%) between 1998-99 alone. The latest indications of enrollments suggest that this pattern continued in 2000 but is showing signs of bottoming out at most (but not all) HBUs in 2001. A similar pattern was evident at UNISA and Technikon South Africa, peaking in 1995 and</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>declining by about 20,000 each since then. In sharp contrast, Afrikaans HWUs increased steadily by 55,000 from 73,000 in 1993 to 128,000 in 1999. Enrollments at English HWUs remained relatively static.</p> <p>Higher Education Act (1997)</p>
Sudan	<p>Yes. Gordon Memorial College (GMC), opened in 1902 as a primary school, which eventually expanded and upgraded, and as of 1939, its higher schools provided post-secondary training in a variety of programs. In 1945, the University of London entered into a special relationship with GMC whereby courses for London degrees were instituted in arts, science, law, agriculture, and engineering.</p> <p>The Kitchner School of Medicine (KSM) was founded in 1924. GMC and KSM were merged in 1951 into the University College of Khartoum. The University of Khartoum (UK) was established in 1956.</p> <p>The number of higher education institutions in 2000 stood at 26 public universities and 21 private universities and colleges. In 1999-2000, the system admitted 38,623 students, representing 68.8% of total applicants.</p> <p>The politicization of higher education has relegated research to a secondary requirement for promotion purposes. Research budgets have practically disappeared from university budgets during the past decade.</p> <p>Out of a total of 3,339 publications for the Sudan during the 27-year period 1973-99, Sudanese universities' share is about 76.3%. However, research output during the 1990s decreased by about 22% from its level in the 1980s for the country; University of Khartoum saw a 30% decline.</p> <p>Higher education Act (1991)</p>
Swaziland	<p>Yes. William Pitcher Teacher Training College, the first institution designed to produce teachers of both primary and secondary education, opened in Bremersdorp in 1962. In that same year, the colonial administration racially integrated the system of education in Swaziland, enabling Swazi students to attend European schools that could better prepare them for the tertiary level.</p> <p>Most significantly, the University of Basutoland, Bechuanaland and Swaziland (UBBS) was established by the British government at the original Pius XII Catholic University College in Roma, Basutoland, in 1964. After the independence of Lesotho and Botswana in 1966, the name UBBS was changed to the University of Botswana, Lesotho, and Swaziland (UBLS).</p> <p>In 1986, projected enrollments for the university were higher than the projections made in the Fourth National Development Plan (1983-84 to 1987-88). The commission expected a growth of 8.5% each year, which would increase the student body to 1,783 by 1990.</p> <p>University of Swaziland Act (Act No. 2) (1983)</p>
Tanzania	<p>Yes. The first higher education institution in the country was established in 1961 as a college of the University of London. The University College of Tanganyika, as it was then called, started with the Faculty of Law. In 1963, the college became a constituent college of the University of East Africa, together with Makerere and Nairobi university colleges. It was then known as University College Dar es Salaam. In 1970, it was decided to dissolve the University of East Africa. Thus, on 1 July 1970, University College Dar es Salaam became an independent national university. Public institutions greatly depend on the government for</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>financial support. It is advisable to distinguish here between university and non-university institutions because many non-university institutions charge fees, which are not paid by the student directly but by the sponsoring authority, usually a government ministry or parastatal. Besides collecting fees, these institutions also receive a subsidy from the government. The size of the subsidy often depends on the negotiation skills of the parent ministry or parastatal because government funding of universities is not guided by any clear and consistent formula. Public higher learning institutions have limited freedom and autonomy. Chief executives of such institutions and other top leaders are usually appointed by the state, with or without consultation with other stakeholders. The dominant mode of relationship between the government and these institutions is one of state control or interference.</p> <p>Although each institution has its own regulations regarding staff appointment, evaluation, promotion, and even dismissal, these regulations are modeled on government regulations on similar issues. It is therefore fair to say that these institutions operate very much like civil service departments.</p> <p>Another issue relating to governance is the question of participation of stakeholders in decision-making. Workers' participation is a well-established practice in public organizations in Tanzania. It is part of the country's socialist legacy. At the University of Dar es Salaam, student representation is extended even to sensitive organs like the examination committees, which sometimes handle appeals on examination results.</p> <p>Education Act (1978)</p>
Togo	<p>No. Since 1965, the governments of Togo and Bénin, with the assistance of the French government, have inaugurated an embryonic university called the Advanced Institute of Benin (<i>Institut Supérieur de Bénin</i>) which consists of two branches based in Porto-Novo and Lomé. In 1970, the two states decided to set up their own universities.</p> <p>What started in 1970 as four schools (letters, law, science and medicine) scattered to the four corners of the city was later grouped into a single university campus situated in Lomé.</p>
Tonga	<p>No. No official national university, but a private one, 'Atensi' exists and runs degree courses. The University of the South Pacific (USP) operates a center in Tonga for extension students.</p>
Uganda	<p>Yes. The 1920s were formative years in the development of Uganda's present educational system. Previously left in the hands of Christian missionaries, the colonial government assumed direct responsibility for the education sector in the 1920s. It was during this initial period that Makerere University Kampala (MUK) was founded as a technical college to serve students from the British East African territories of Kenya, Tanganyika, and Uganda. Following the Asquith Report in 1949, the college obtained a semi-autonomous status and became affiliated to London University.</p> <p>In the second phase, the main preoccupation of education planners was the Africanization of the civil service structure to encourage modernization and development. In 1953, students at Makerere College first gained London degrees. In 1956, the founding of the Royal Technical College in Nairobi ended Makerere's preeminence as the only institute of higher education in East Africa. A few years later, in 1961, the University College of Dar es Salaam was founded.</p> <p>In the third phase, in 1963, the three colleges merged to become the constituent colleges of the University of East Africa. At Makerere, undergraduate enrollment increased from 1,331 in 1964-65 to 1,805 in 1967-68. By 1967-68, Makerere had achieved 20% East Africanization of its academic staff. By 1970-71, the number of Ugandans studying at Makerere had increased to 2638. In 1970, at the close of this third phase, the University of</p>

COUNTRY	STATUS OF HIGHER EDUCATION LAWS
	<p>East Africa was dissolved into three full-fledged independent universities at Makerere in Uganda, Nairobi in Kenya, and Dar es Salaam in Tanzania.</p> <p>The 1970s and 1980s, the fourth period, could be characterized as arduous years of political maneuvering and underfunding in the education sector. Beginning in 1971, Uganda was plunged into the most turbulent years of its history with the coming to power of Idi Amin.</p> <p>Currently Uganda hosts two public universities: Makerere University Kampala and Mbarara University of Science and Technology. The government recently announced the founding of two more publicly funded universities, Northern Uganda University of Agriculture and Kyambogo University.</p> <p>In 2001 the Parliament approved the new Universities and Other Tertiary Institutions Law which superseded prior legislation, gave greater autonomy to institutions, and created the National Council of Higher Education.</p>
Western Sahara	No universities.
Zambia	<p>Yes. The idea of creating a Zambian university was first proposed at the UNESCO sponsored Conference on the Development of Higher Education in Africa convened in 1962 in Tananarive, Madagascar. In late 1964, the new Zambian government, then barely two months old proceeded to appoint a provisional council. The birth of the University of Zambia, in the absence of a higher education tradition, went remarkably smoothly.</p> <p>For nearly two decades following independence, virtually no fees were charged by institutions financed or supported by the government at any level. Yet, even today, the proportion of the cost-sharing that students are responsible for is still quite small: at the university level, students are obligated to pay 25% of the annual tuition that the university receives from the government (approximately \$3,500), on behalf of each student. On the institutional side, the matter of finance has become a highly problematic issue in the face of the persistent government budgetary difficulties.</p> <p>Technical Education and Vocational Training Act (1973) The University of Zambia Act (1987)</p>
Zimbabwe	<p>No. The establishment of the University College of Rhodesia and Nyasaland in 1957 was the first-ever colonial government initiative toward instituting a post-secondary school in the Federation of Rhodesia and Nyasaland. The University College of Rhodesia and Nyasaland received its Royal Charter on February 10, 1955. The student population stood at 717 full-time and 141 part-time after a decade of the university college's existence.</p> <p>The University College of Rhodesia and Nyasaland started with three faculties: education, arts, and sciences. The faculty of engineering came into existence in 1974, and the faculties of agriculture, commerce, and law, respectively, followed in 1980.</p> <p>University of Zimbabwe (1990)</p>

Appendix D. Educational Background of Heads of State

Country	Head of State or Government	Education
Afghanistan	Hamid Karzai	Post-graduate course in political science at Himachal University, India 1979 to 1983.
Albania	Alfred Moisiu	PhD from the Academy of Military Engineering Moscow, Military Science
Algeria	Abdelaziz Bouteflika	Completed secondary school then joined military.
Andorra	Marc Forne Molne	Lawyer
Angola	Jose Eduardo Dos Santos	Degree in Petroleum Engineering (1969) Studies in communication
Argentina	Nestor Kirchner	Lawyer. Attended La Plata National University, Argentina graduating in 1976.
Armenia	Robert Kocharian	Mechanical Engineer. He received his secondary education in Stepanakert. He served in the Soviet Army in 1972-74. In 1982, Robert Kocharian graduated from Yerevan Polytechnic Institute's Electro-Technical Department with honors.
Australia	Major General Michael Jeffery	At age 16, General Jeffery left Perth to attend the Royal Military College, Duntroon. After graduation in 1958, he served in a number of junior regimental appointments with 17 National Service Training Company and the Special Air Service Regiment (SASR) in Perth. In 1972 he was selected to attend the British Army Staff College at Camberley and was then promoted Lieutenant Colonel to command the 2nd Battalion, The Pacific Islands Regiment.
Austria	Heinz Fischer	Studied law at the University of Vienna earning a doctorate in 1961. Pursued an academic career becoming a Professor of Political Science at the University of Innsbruck in 1993.
Azerbaijan	Ilham Aliyev	He graduated from Moscow's prestigious State Institute for International Relations (Mgimo) in 1982. PhD in history (Moscow State University) (1985).
The Bahamas	Ivy Dumont	Teacher Certificate by the Bahamas Teachers Colleges. Recipient of a Fulbright Grant as a participant in an international Teacher Development Programme in 1962/1963. Bachelor of

Country	Head of State or Government	Education
		Education, University of Miami (1970), Doctorate in Public Administration (DPA) from Nova University (1976-1978)
Bahrain	Hamad bin Isa Al Califa	Studied secondary school from Leys public school in England and later at the military colleges in UK and the US.
Bangladesh	Iajuddin Ahmed	M.S. and Ph.D. from the University of Wisconsin. Joined the University of Dhaka as an Assistant Professor in Department of Soil Sciences and later became Dean of the Faculty of Biological Science.
Barbados	Sir Clifford Husbands	Law degree Middle Temple College, London.
Belarus	Aleksandr Lukashenko	Mogilev State University (1975) and Belarusian Agricultural Academy (1985) – History and Economics
Belgium	Albert II	Attended Swiss private school Institute Le Rosey for pre-university education.
Belize	Sir Colville Young	University of Work (linguistics)
Benin	Mathieu Kerekou	Studied in military schools in Mali and Senegal
Bhutan	Jigme Singye Wangchuck	Studied at St. Joseph's School in Darjeeling, England, and Wangchuk Academy
Bolivia	Carlos Diego Mesa (Mesa was head of state when this research was carried out.)	Historian and journalist Graduated in 1971 with a bachelor from San Calixto de Seguencoma, and withdrew from a degree in literature in 1978 from Universidad Mayor de San Andres.
Bosnia and Herzegovina	Sulejman Tihic Niko Lozancic Dragan Cavic	Tihic graduated from the University of Sarajevo with a law degree. Lozancic: could not find Cavic: graduated from the Economic Faculty in Banja Luka (1980)
Botswana	Festus Gontebanye Mogae	Economics (Oxford University) (1968), Masters in Development Economics (Sussex University) (1970)
Brazil	Luiz Inacio Lula da Silva	Limited formal education primary school grade 4 level. Became elected President of the Steel Workers' Union of Sa Bernardo do Campo and Diadema.
Bulgaria	Georgi Purvanov	Mathematics High School in Pernik, MA in History 1975 from the University of St. Kliment, Ohridski; PhD in History in 1988.
Burkina Faso	Capt Blaise Compaore	Military College achieving rank of captain Burkinabe later became Minister of Justice.
Burma	Lt. Gen Soe Win	Graduate of Defense Services Academy

Country	Head of State or Government	Education
Burundi	Domitien Ndayizeye	Industrial engineering degree from Belgium (1981).
Cambodia	Norodom Sihamoni	Attended the Academy of Music Arts in Prague where he studied classical dance and music until 1975. Remained in Czechoslovakia during the 1970 coup d'etat leaving in 1975 to study filmmaking in North Korea in 1975 and eventually returned to Cambodia in 1977. Moved to France in 1981 to teach ballet. In 1993 appointed Cambodian delegate to UNESCO. By 2004 he was selected by a special nine-member council as king.
Cameroon	Paul Biya	Graduated in 1961 with a diploma in international relations from University of Paris at Sciences Po. Law (University of Sorbonne)
Canada	Adrienne Clarkson	Bachelor of Arts (Trinity College) and Masters of Arts, English both from University of Toronto. Post-graduate studies at the Sorbonne.
Cape Verde	Pedro Pires	Started Lisbon University of Sciences, but did not complete.
Central African Republic	Francois Bozize	Attended a military officers' training college in Central African province of Bouar, becoming captain in 1975. Appointed brigadier-general in 1978.
Chad	Idriss Deby	Went to officers school at N'Djamena, obtained pilot's license in 1976
Chile	Ricardo Lagos (Lagos was head of state when this research was carried out.)	Law degree (Universidad de Chile) (1959); and PhD (Duke University) (1962)
China	Hu Jintao	Graduated with a degree in hydraulics engineering in 1964 (Tsinghua University).
Colombia	Alvaro Uribe Velez	Law degree from Universidad de Antioquia (1977); Post-graduate degree in management and administration (Harvard University) (1993)
Republic of the Congo	Denis Sassou-Nguesso	Military training in Algeria and at Sant Maixent, France
Costa Rica	Abel Pacheco	Medicine (National Autonomous University of Mexico), Psychiatry (Louisiana State University)
Cote d'Ivoire	Laurent Gbagbo	Bachelor of Philosophy (Abidjan), Bachelor of History, Master of History (Sorbonne)
Croatia	Stjepan Mesic	Law (University of Zagreb)
Cuba	Fidel Castro Ruz	Law (University of Havana) (1950)
Cyprus	Tassos Papadopoulos	Law (Gray's Inn)

Country	Head of State or Government	Education
Czech Republic	Vaclav Klaus	Prague School of Economics (1963), some study in Italy (1966) and Cornell University in the United States (1969). PhD at the Institute of Economics at the Czechoslovak Academy of Sciences. Holds honorary doctorates at the Rochester Institute of Technology and US Suffolk University.
Democratic Republic of Congo	Joseph Kabila	Received military training from Rwanda and Uganda
Denmark	Margrethe II	Degree in philosophy (Copenhagen University) (1960); Archeology (Diploma) at the University of Cambridge (1960-1961); Political science (Aarhus University) (1961-1962), (Sorbonne) (1963), London School of Economics (1965)
Djibouti	Ismail Omar Guelleh	
Dominican Republic	Leonel Fernandez Reyna	Law (Autonomous University of Santo Domingo) (Magna cum Laude) (1978)
East Timor	Kay Rala Xanana Gusmao	Jesuit Seminary School and night school (secondary school level)
Ecuador	Lucio Gutierrez Borbua	Military school
Egypt	Mohammed Hosni Mubarak	Bachelor of Military Sciences (1948) BA in Aviation Sciences (1950)
El Salvador	Elias Antonia Saca	Bachelor of Journalism at the University of El Salvador
Equatorial Guinea	Brid. Gen (Ret) Teodoro Obiang Nguema Mbasogo	“Francisco Franco” Military Academy of Saragosse (Spain)
Estonia	Arnold Ruutel	Janeda Agricultural College (1949) Agronomist, Estonian Agricultural Academy (1964) Candidate of Agricultural Sciences (1972) Doctor of Agricultural Sciences (1991)
Ethiopia	Girma Woldegiorgis	Genet Military School (1936)
Finland	Tarja Halonen	Lawyer. Graduated from the University of Helsinki in 1968 with a Masters of Law.
France	Jacques Chirac	Graduate degree from the Ecole Nationale d’Administration in 1959.
Gabon	President El Hadj Omar Bongo Ondimba	Secondary school
Gambia	Yahya Jammeh	Military Police Officers Basic Course, Port McClellan, Alabama, Diploma in Military Science (1993-1994)
Georgia	Mikheil Saakashvili	Law (Kiev University, Institution of International Relations) Masters of Law (Columbia University) Diploma of Human Rights Comparative Law (Strasbourg Human Rights International Institute)

Country	Head of State or Government	Education
Germany	Horst Koehler	Economics (Eberhard Karls University) (1969) PhD in Economics (University of Tübingen) (1977)
Ghana	John Agyekum Kufuor	Lawyer. (Lincoln Inn) (1961) Honors BA degree in Economics, Philosophy and Politics (Oxford University) (1964) Masters degree (Oxford University) (1964)
Guinea	Lansana Conte	Military school in Senegal and Cote d'Ivoire
Guinea-Bissau	Henrique Rosa	
Guyana	Bharrat Jagdeo	Masters Degree in Economics (Moscow) (1990)
Haiti	Boniface Alexandre	Lawyer
Honduras	Ricardo Rodolfo Maduro Joest	Economics (Stanford University) (1969)
Hungary	Ferenc Madl	Diploma, Faculty of Politics and Law of the Budapest University of Sciences (ELTE) (1955) Candidate in politics and international comparative law (University of Strasbourg) (1964) Doctorate (1974)
Iceland	Olafur Grimsson	Economics and political science (University of Manchester) (1970)
India	Manhoman Singh	Intermediate Panjab University (1950) BA Economics (Hon), Panjab University (1952) MA. Economics (Panjab University) (1954) Economics Tripos (First Class Honours), Cambridge University (1957) D. Phil (Nuffield College), University of Oxford (19620)
Indonesia	Susilo Bambang Yudhoyono	Indonesian Military Academy (1973) MA in business management (Webster University) PhD in Agricultural Economics (Bogor Institute of Agriculture) (2004)
Iran	Mohammad Khatami (Khatami was head of state when this research was carried out.)	BA (Isfahan University) Senior Level of Religious Studies (Qom Seminary) Post-graduate course in education sciences (Tehran University) Ijtihad (Practice of religious leadership) (Qom Seminary)
Ireland	Mary McAleese	Law (Queen's University, Belfast, 1973)
Israel	Moshe Katzav	BA Economics and History (Hebrew University of Jerusalem) (1971)
Italy	Carlo Azeglio Ciampi	BA in Literature (Scuola Normale Superiore of Pisa) (1941) LLB (University of Pisa) (1946)

Country	Head of State or Government	Education
Jamaica	Sir Howard Cooke	Teacher
Japan	Emperor Akihito	Privately tutored Studies at the Department of Political Science at Gakushuin University in Tokyo (never received degree)
Jordan	Abdallah II	Sandhurst Royal Military Academy One-year special studies course in Middle Eastern Affairs (Oxford University)
Kazakhstan	Nursultan Nazarbayev	Metallurgic engineer and economist.
Kenya	Mwai Kibaki	BA in Economics (Makerere University) (1955) BSc Public Finance (London School of Economics) (graduated with distinction)
North Korea	Marshall Kim Jong Il	Political Economy (Kim Il-Sung University (1964) English (University of Malta)
South Korea	Roh Moo-hyun	Law. Passed National Bar Examination (1975)
Kuwait	Jabir al-Ahmad al-Jabir Al-Sabah	Home taught
Kyrgyzstan	Askar Akayev	Doctor of Science (Leningrad Fine Mechanics and Optics Institute) (1967)
Latvia	Vaira Vike-Freiberga	BA (University of Toronto) (1958) MA (University of Toronto) (1960) PhD in Psychology (McGill University) (1965)
Lebanon	Emile Lahoud	Navel engineering (UK) (1958-1960) Various naval courses (US)
Lesotho	Letsie III	Law (National University in Lesotho) (1984) Diploma in English Legal Studies (University of Bristol) (1986) Development Studies (University of Cambridge) (1989) Agricultural Economics (Wye College, University of London) (1989)
Liberia	Gyude Bryant	Economics (Cuttington University College)
Libya	Col. Muammar Abu Minyar al-Qadhafi (de facto head of state)	Libyan Military Academy Sandhurst Royal Military Academy
Liechtenstein	Prince Adam Hans II	Licentiate in Management and Economics (University of St. Gallen) (1969)
Lithuania	Valdas Adamkus	Lithuanian Gymnasium Faculty of Natural Science (Munich University) Illinois Institute of Technology (civil engineer) (1960)
Luxembourg	Grand Duke Henri	Sandhurst (1974)
Macedonia	Branko Crvenkovski	Electrical Engineering (Skopje) (1985)
Madagascar	Marc Ravalomanana	Secondary school

Country	Head of State or Government	Education
Malawi	Bingu wa Mutharika	Master in Economics (University of Delhi, India) PhD in development economics (Pacific Western University in Los Angeles)
Malaysia	Tuanku Syed Sirajuddin ibni Almarhum Tuanku Syed Putra Jamalullail	Sandhurst Royal Military Academy
Maldives	Maumoon Abdul Gayoom	MA in Islamic Studies (Al-Azhar University, Cairo) Law and Philosophy (American University in Cairo)
Mali	Amadou Toumani Toure	Military school
Malta	Edward Fenech Adami	Economics and then law (1959) (University of Malta)
Marshall Islands	Kessai Note	Bachelors degree (Papua New Guinea)
Mauritania	Maaouya Ould Sid Ahmed Taya	Military Academy (France)
Mauritius	Sir Anerood Jugnauth	Law (called to Bar in Londong, England) (1954)
Mexico	Vicente Fox Quesada	Administration (Latin American University)
Micronesia	Joseph J. "Joe" Urusemal	BA in Justice (1976)
Moldova	Vladimir Voronin	Co-Operativee College from Chisinau (1961) Union Institute for Food Industry (1971) Academy of Social Sciences (1983) Academy of the Ministry of Home Affairs (USSR) (1991)
Monaco	Prince Rainier III	Bachelor of Arts (University of Montpellier) Institute d'études politiques de Paris
Morocco	Mohamed VI	BA in law (Rabat Mohammed V University) (1985) Political science (1987) Doctorate in Law (Nice-Sophia Antipolis) (1993)
Mozambique	Armando Guebuza	Never attended university
Namibia	Hifikepunye Pohamba	None
Nepal	King Bir Bikram Shah Dev Gyanendra	Tribhuwan University (1969)
Netherlands	Queen Beatrix	Law (Leidin University) (1961)
New Zealand	Dame Silvia Cartwright	LLB (Otago University) (1967)
Niger	Tandja Mamadou	Military school
Nigeria	Olusegun Obasanjo	Officer in army
Norway	Harald V	Oslo University Cadet College for Cavalry Officers and Military Academy Social science, history and economics, Baillol College (Oxford University)
Oman	Qaboos bin Said Al Said	Sandhurst Royal Military Academy (1960)
Pakistan	General Pervez Musharraf	Started at Forman Christian College, Lahore
Palau	Tommy Remengesau Jr.	Grand Valley State University (Allendale, Michigan)

Country	Head of State or Government	Education
Panama	Martin Torrijos Espino	Political Science and Economics (Texas A&M University, College Station, Texas)
Paraguay	Nicanor Duarte Fruits	Lawyer (Faculty of Legal and Diplomatic Sciences of the Catholic University of Asunción) (1984) Lawyer in Philosophy (National University of Asunción) (1989) Postgraduate Studies in Political Sciences (National University and Foundation Hans Seidel) (1992)
Peru	Alejandro Toledo	University of California San Francisco PhD in Economics (Stanford)
Philippines	Gloria Macapagal-Arroyo	BA (Georgetown University) (magna cum laude) Master's degree in Economics (Ateneo de Manila University) Doctorate degree in Economics (University of the Philippines)
Poland	Aleksander Kwasniewski	Studied for transport economics (Gdansk University) (1973-1977) (never graduated)
Portugal	Jorge Sampaio	Law (Lisbon University) (1961)
Qatar	Hamad bin Khalifa Al Thani	Royal Military Academy, Sandhurst (1971)
Romania	Traian Basescu	Navy Institute (Mircea cel Batran) (1976); Advanced Management Training Course of Norwegian Academy (1995)
Russia	Vladimir Vladimirovich Putin	Law (Leningrad State University) (1975) PhD in Economics (Leningrad State University)
Rwanda	Paul Kagame	Military training (US)
Saint Kitts and Nevis	Cuthbert Montraville Sebastian	Mount Allison University (New Brunswick, Canada) Surgeon
Samoa	Tanumafili Malietoa II	Private tutoring
Sao Tome and Principe	Fradique De Menezes	Free University of Brussels
Saudi Arabia	Bin Abd al-Aziz Al Saud Fahd	Wahhabi Islam, religious studies and formal education at the Knowledge Institute in Mecca
Senegal	Abdoulaye Wade	Diploma of teaching (William Ponty, Sebikotane, Senegal) (1947) Certificate of higher studies in general psychology (Faculty of Arts of Besancon) (1952) Certificate of higher study in mathematics (general mathematics) (Faculty of Sciences at Besancon) (1953) Certificate of higher studies of mathematics, physics and chemistry

Country	Head of State or Government	Education
		(Faculty of Science of Besancon) Diploma of Higher Studies of Political Economy, Economic Sciences and Faculty of Law (1957) DES Economic Sciences (1958) Certificate of Higher Studies of Psychology of the Social Life (Faculty of Arts of Grenoble) Doctorate of Right and Sciences Economic (Grenoble) (1959)
Serbia and Montenegro	Svetozar Marovic Boris Tadic	Marovic: graduated from law (Podgorica University) Tadic: Psychology (Belgrade University)
Seychelles	James Alix Michel	Teacher
Sierra Leone	Ahmad Tejan Kabbah	Bachelor's Degree in Economics, (Cardiff College of Technology and Commerce and University College Aberystwyth, Wales (UK)) (1959) Law (Gray's Inn) (1969)
Singapore	Sellapan Rama Nathan	University of Malaya (1954) with a Diploma in Social Studies (Distinction)
Slovakia	Ivan Gasparovic	Law (Comenius University, Bratislava) (1964)
Slovenia	Janez Drnovsek	Economics (University of Ljubljana's Faculty of Economics) PhD in economic Sciences (Maribor) (1986)
Somalia	Abdullahi Yusuf Ahmed	Military training (Italy and Soviet Union)
South Africa	Thabo Mvuyelwa Mbeki	First year economics degree (University of London) (1961-1962) Master of Economics degree (University of Sussex) (1966)
Spain	King Juan Carlos I	Army Officer training (1957) Naval School at Pontevedra Air Force school in San Javier in Murcia Complutense University (1961)
Sri Lanka	Chandrika Bandaranaike Kumaratunga	LLB (Aquinas University College Colombo) Political Science (University of Paris) Diploma in Group Leadership (University of Paris) Started PhD in Development Economics at the University of Paris (but did not complete)
Sudan	Lt. Gen. Umar Hassan Ahmad al-Bashir	Sudan Academy for Administrative Sciences
Suriname	Ronaldo Ronald Venetiaan	Doctorate (natural history) (Leiden)
Swaziland	Mswati III	Secondary school
Sweden	Carl Gustaf XVI	Naval training (1968) Programme of Academic studies comprising history, sociology, political

Country	Head of State or Government	Education
		science, financial law and economics at University of Uppsala and economics at the University of Stockholm
Switzerland	Samuel Schmid	Lawyer Diploma (University of Berne) (1973), Notary (1978)
Syria	Bashar al-Asad	MD in Ophthalmology (Damascus University (1992) and England)
Taiwan	Shui-bian Chen	Law (National Taiwan University)
Tanzania	Benjamin William Mkapa	Preliminary Arts (Makerere University) (1959) Bachelor of Arts in English (Makerere University) (1962)
Thailand	Adunyatet Phumiphon	Gymnase Classique Cantonal of Lausanne (Bachelors of Letters, Diploma) Political Science and Law (Lausanne University) (1950)
Togo	Faure Gnassingbe	Management degree (Paris-Dauphne) MBA (George Washington University)
Trinidad and Tobago	George Maxwell Richards	Engineer. Queen's Royal College (Port of Spain)
Tunisia	Zine El Abidine Ben Ali	Diploma of Military Studies (Saint-Cyr military school) Artillery School (Chalons-On-Mome) Diploma of electrical engineering
Turkey	Ahmet Necdet Sezer	BA in law (1962) MA in civil law (1978)
Turkmenistan	Saparmurat Niyazov	Power Engineering (Leningrad Polytechnic Institute) (1966)
Uganda	Yoweri Kaguta Museveni	Bachelor of Arts in Economics and Political Science (University of Dar es Salaam) (1970)
Ukraine	Viktor Yushchenko	Economics (Ternopil)
United Arab Emirates	Khalifa bin Zayid Al Nuhyan	No formal university training
United Kingdom	Elizabeth II	Studied constitutional history and law independently at home
United States	George W. Bush	Bachelor's degree (Yale University) (1968) MBA (Harvard University) (1975)
Uruguay	Tabare Vazquez	Medicine (1969) (specialist in radiation oncology) Additional training at the Gustave Roussy Institute in Paris (1976)
Uzbekistan	Islom Karimov	Engineering and Economics (Tashkent)
Vanuatu	Kalkot Matas Kelekele	Lawyer
Venezuela	Hugo Chavez Frias	M.S in Military Sciences and Engineering (Venezuelan Academy of Military Sciences) (1975) Did further work at Simon Bolivar University in Caracas (but did not complete degreee)

Country	Head of State or Government	Education
Vietnam	Nong Duc Manh	Geologist (University of Mining and Geology) (1970)
Zambia	Levy Patrick Mwanawasa	Law (University of Zambia)
Zimbabwe	Robert Mugabe	Teacher. BA in English and History (Fort Hare University in South Africa) (1951) Diploma and a Bachelor's degree in Education (University of South Africa) Economics (University of London)

Source: Central Intelligence Agency. **Chiefs of State & Cabinet Members. March 2005**
(<http://www.cia.gov/cia/publications/chiefs/chiefspdf/March2005ChiefsDirectory.pdf>) (Last accessed: May 24, 2005)

Box 1

Higher Education in Mauritius and Tanzania: A Comparison

The small island of Mauritius and the much larger nation of Tanzania are joined by the Indian Ocean, but have had contrasting experiences with higher education. While the former has made impressive progress towards increasing enrollment and enhancing quality, Tanzania's tertiary education system has struggled. Perhaps not coincidentally, Mauritius has moved from being a low-income country in the 1960s to a middle-income country today, while Tanzania remains as one of the world's poorer nations.

Per capita gross domestic product (GDP) in Tanzania is just \$700 in PPP terms. In contrast, Mauritius has achieved a per capita GDP of \$12,800 in PPP terms as a result of rapid and sustained economic growth since the 1970s. Tanzania can draw on natural resources including gold, natural gas, diamonds, tin, and coal, whereas Mauritius lacks such potential advantages. In Tanzania, agriculture accounts for 43 per cent of GDP, but industry just 17 per cent. In Mauritius, services account for 62 per cent of GDP as the economy has diversified from sugarcane exports into textiles, banking, and tourism. Life expectancy in Tanzania is 45 years, and fertility remains high at over five children per woman. The scene in Mauritius is dramatically different: life expectancy is 72 years, and fertility has declined to just under two children per woman.¹²⁴

Tanzania's higher education performance mirrors its overall economic status, with a gross tertiary enrollment rate of just 1 per cent¹²⁵ and a higher education sector that for a long time was bedeviled by strong government influence in appointment decisions and extensive student involvement in planning and even in examination committees.¹²⁶ The country's own Higher Education Policy in 1999 expressed concerns with a gender imbalance in favor of males, a proliferation of private tertiary institutions, and weak performance in science-related subjects.

Tanzanian higher education took an auspicious step in 1961 with the founding of the University of Dar es Salaam (UDSM) as an affiliate of the University of London. In 1970 UDSM became an independent university. The government supplied all funds, and the university became a symbol of national pride. Given the needs of the country, it was natural that UDSM would become a "development university", oriented toward educating students so that they could participate in Tanzania's development.¹²⁷ UDSM acquired a reputation for scholarship in Africa and beyond.

Economic problems in Tanzania and events in the East African region quickly led to financial difficulties at UDSM; the 1980s were a particularly low point for the university, which was rife with apathy, inattention to students, and administrative problems. Facilities deteriorated, faculty departed, student strikes became a common feature, and the quality of teaching and learning declined.

¹²⁴ CIA World Factbook (2005): Mauritius and Tanzania. Available at: <http://www.cia.gov/cia/publications/factbook>

¹²⁵ UNESCO Institute for Statistics (UIS) (2005): *Global Education Digest 2005*. UIS, Montreal.

¹²⁶ Damtew Teferra and Philip J Altbach, eds. (2003): *African Higher Education: An International Reference Handbook*. Indiana University Press.

¹²⁷ Most of the information on Tanzania is taken from Brian Cooksey, Lisbeth Levey, and Daniel Mkude (2001): *Higher Education in Tanzania: A Case Study*. Carnegie Corporation of New York, The Ford Foundation, the John D. and Catherine T. MacArthur Foundation, and the Rockefeller Foundation. Internet: www.foundation-partnership.org/pubs/tanzania/index.php.

The 1990s saw the inception of the Institutional Transformation Programme, which led to enrollment surging from 3,164 in 1993/4 to 6,846 in 2000/01 and 14,221 in 2003/04¹²⁸ with female students now comprising about 30% of total student population. A 15-year strategic plan adopted in 1994 aimed to increase the university's effectiveness. Recently, the university has made efforts to be less subject to government control. More broadly, the 1990s saw the introduction of private universities and new public universities. Enrollment in higher education swelled, and government, the private sector, and other donors all made increased funding available. Relations between tertiary institutions and the state improved, the exodus of staff decreased significantly, the expansion and rehabilitation of physical facilities, and an increased focus on student and staff welfare all served to reinvigorate Tanzanian universities.

An academic audit in 1998-1999 revealed a glacial pace of curricular change. In light of Tanzania's efforts to insert itself into the international economy, such stasis in curriculum imposes considerable constraints on students' ability to enter the workforce well prepared. In light of the audit, a number of departments at UDSM did change their course offerings and moved in the direction of demand-driven courses. Extensive computerization of the campus has also been completed in recent years. Despite its weaknesses, UDSM is considered by many to be in the top echelon of African universities on the move.

Tanzania is hobbled by unnecessarily high costs in tertiary education. The higher education system consists of some 160 small institutions with low student-to-staff ratios. Several different ministries are involved in supervising these institutions – perhaps a legacy of higher education training students for public employment – with the overall picture being one of bureaucratic inefficiency. The Government has in 2005 initiated efforts to rationalize the sector.

Tanzania aims to leave its developing country status as heralded in its "Development Vision 2025". This Vision recognizes the importance of knowledge in the emerging world economy. In 1999, the country officially recognized that major changes would be needed in its higher education system if this goal was to be reached. In particular, tertiary enrollment would need to increase, gender balance would have to be addressed, and financing issues would have to be resolved. Special note was taken of the need to enhance science and technology capacities in universities.

But relatively little has changed in the last five years in Tanzania's higher education system. There are signs of movement, but there is a very long way to go. In a country beset by economic and social difficulties, the tertiary education system could make a difference in economic development, gender relations, and connections with the rest of the world. One bright spot is seen in the fact that a healthy 39% of all tertiary students concentrate in the sciences¹²⁹ and that some institutions like the UDSM have taken affirmative action to increase female enrollment with encouraging results. Of course, even this bright point is shadowed by the fact mentioned earlier, that actual performance in the sciences is weak.

Until the 1980s, Mauritius faced problems similar to those of Tanzania in the higher education field. Enrollment in the 1960s and 1970s was below 1 per cent,¹³⁰ and high graduate unemployment led to student unrest in 1979.¹³¹

¹²⁸ University of Dar es Salaam (2004): *UDSM Ten Years Experience of The Institutional Transformation Programme (ITP)*.

¹²⁹ TFHE (2000) op cit.

¹³⁰ TFHE (2000) op cit.

¹³¹ University of Mauritius (2004): Strategic Plan, Overview. Internet: <http://www.uom.ac.mu/AboutUs/StrategicPlan/overview.htm>.

Since the mid-1980s, Mauritius has turned around its higher education system. Although the country's population is one-thirtieth the size of Tanzania's, it has half the number of tertiary students.¹³² Its gross tertiary enrollment ratio has risen from 1 per cent in 1985¹³³ to 15 per cent today.¹³⁴ This growth built on an earlier strengthening of the country's primary and secondary education systems. Within the University of Mauritius, as well, growth was incremental, beginning with two or three key faculties and gradually expanding in response to students' needs.

Mauritius has focused on improving the quality as well as the quantity of its higher education. The number of students graduating annually from the University with a Bachelor's degree has risen from less than 40 to over 400 since 1989. In addition, there are many non-degree students.¹³⁵ The *University of Mauritius Research Journal*, which covers science and technology, law and management, the social sciences, and the humanities, has expanded the country's scope for publishing peer-reviewed material. The University has extended collaboration with other universities in the region by helping to set up the University of the Indian Ocean.

National needs have been a key driver of curriculum design in Mauritius. The University has five faculties – agriculture, engineering, law and management, science, and social studies and humanities. The focus of each faculty is on the country's development requirements (including an emerging emphasis on financial and technological services). The Faculty of Engineering, for example, awards degrees in computer science (which is helping the economy to diversify into the lucrative services sector) and textile technology (textiles have played a vital role in economic growth). In recognition of the broad skills base needed in modern engineering, moreover, the Faculty also trains students in economics, accounting, information technology, and communication skills. Earlier this year the country increased its emphasis on science and technology with the founding of the University of Technology.

The higher education system focuses not just on growth-promoting activities but also on broader aspects of development. To address issues of poverty, the University created a Center for Applied Social Research, whose recent studies include surveys on social exclusion and a report on the attitudes of unemployed people to working in the country's Export Processing Zones. To address issues of environmental sustainability, the University has set up consultancy partnerships with international bodies such as UNESCO and the World Bank to monitor water and air quality, track coastal developments, and conduct Environmental Impact Assessments for development projects.

These efforts are having broad impacts. Before the tertiary education reforms, three-fifths of Mauritian students studied abroad.¹³⁶ The improvements have helped to slow this brain drain and, according to a study by Belli and co-authors, they are also likely to provide large benefits to Mauritian society. As well as increased earnings for students, tax revenues will rise and the education system as a whole will improve.¹³⁷

Unlike Tanzania, Mauritius was able to establish good internal governance in higher education; in addition, the University was able to maintain good relations with the government, the private sector, and civil society. The relative absence of conflict has been very useful in allowing the University to remain focused on the needs of the economy. All of this presumably contributed to an annual economic growth rate of 5.2% for Mauritius during the 1990s. Interestingly, Tanzania's economy expanded at almost the same rate during that period (4.8% per year).

¹³² UIS (2005) op cit.

¹³³ TFHE (2000) op cit.

¹³⁴ UIS (2005) op cit.

¹³⁵ University of Mauritius (2004) op cit.

¹³⁶ Pedro Belli, Qaiser Khan, and George Psacharopoulos (1999): "Assessing a higher education project: a Mauritius feasibility study." *Applied Economics* 31: 27–35

¹³⁷ Ibid.

Box 2

Higher Education Case Study – South Korea

In the past half-century, South Korea has progressed from an input-driven to a knowledge-based economy. In 1960, agriculture and fishing accounted for 36 per cent of GDP in the country, with services accounting for 47 per cent and manufacturing for 16 per cent. By 2002, this had reversed. Services now accounted for 63 per cent of employment and agriculture and fishing for just 4 per cent.¹³⁸

With these changes came dramatic income growth. Per capita gross national income rose from extremely low levels in the 1960s to around \$3,000 in 1975 to \$15,000 in PPP terms in 2002.¹³⁹

Much of this growth has been driven by knowledge. According to the World Bank, only three OECD countries invest a higher percentage of their GDP in knowledge (higher education, software, and research and development) than Korea.¹⁴⁰ Korea scores highly on the Bank's Knowledge Economy Index and has continued to improve its score over the past decade. The proportion of individuals with computers, the fraction using the Internet, and the number of patent applications granted have risen significantly since 1995.¹⁴¹

Korea invested heavily in education at all levels. It achieved full primary education enrollment by 1970, and secondary enrollment, which stood at 40 per cent in 1970, had become universal by 1997.¹⁴²

Tertiary education has played a vital part in Korea's knowledge accumulation strategy. As far back as the 1950s, tertiary public education began to grow, with students responsible for tuition payments. In the 1960s, the government began to offer incentives for the expansion of private tertiary education. The 1970s and 1980s saw a focus on the promotion of science and engineering programs, while emphasis in the 1990s shifted to quality assurance, research and development, accountability, and performance-based funding. In 1999 the government adopted the "Brain Korea 21" project, an effort to channel research funds to a relatively narrow set of institutions and graduate students, in an attempt to create world-class research universities in Korea. The effort has been controversial, as those not selected for funding see their research opportunities narrowing.¹⁴³ The next frontier may be the ever-more widespread incorporation of technology into higher learning.

In quantitative terms, the country's investment in higher education has been particularly noteworthy. It invests a higher proportion of GDP (2.5%) in tertiary schooling than all other OECD countries.¹⁴⁴ Interestingly, most of this investment is private: nearly 80 per cent of all higher education students in Korea enroll in private institutions; public spending on tertiary education remains low, at under 10 per cent of the total education budget.¹⁴⁵ Tertiary enrollment

¹³⁸ World Bank (2005): "Korea as a Knowledge Economy." Knowledge for Development Program, April. Internet:

<http://info.worldbank.org/etools/docs/library/138917/Korea%20as%20a%20knowledge%20economy3.pdf>

¹³⁹ World Bank (2004): *World Development Indicators* 2004. World Bank, Washington DC.

¹⁴⁰ World Bank (2005) op cit.

¹⁴¹ World Bank (2005) op cit.

¹⁴² World Bank (2005) op cit.

¹⁴³ Gilton Eun-Jun Lee (2000): "Brain Korea 21: A Development-Oriented National Policy in Korean Higher Education," *International Higher Education* (Spring). Internet:

http://www.bc.edu/bc_org/avp/soe/cihe/newsletter/News19/text16.html

¹⁴⁴ World Bank (2005) op cit. Figure is for 1998.

¹⁴⁵ TFHE (2000) op cit.

rates have soared. Gross enrollment rose from 6 per cent in 1965¹⁴⁶ to a phenomenal 85 per cent in 2002/2003.¹⁴⁷

As advanced education has spread, research output has also improved. In 1981, Korea produced just 234 published academic papers in the sciences and social sciences. In 1995 it produced over 5,000, as enrollment in science-based courses increased to 39 per cent.¹⁴⁸ Although there remain areas for improvement, particularly in terms of the large gender imbalance in tertiary schooling (in 2002/2003 gross enrollment was 105 per cent among males and 64 per cent among females),¹⁴⁹ the country has in general embraced higher education as a means to accelerate development.

Korea, then, has become a knowledge-based economy. It has also become a globalized economy, and its higher education system reflects this. While some countries fight against “brain drain”, Korea encourages students to study abroad and welcomes foreign students to Korea. Most Korean universities have academic exchange programs with universities elsewhere in Asia and in the West. The National Institute for International Education Development¹⁵⁰ assists in the training of overseas Koreans.

The number of Koreans studying abroad increased from approximately 7,000 to over 150,000 between 1971 and 1999.¹⁵¹ A large number of Korean students have studied in the United States and have subsequently played significant roles in Korean academia and government.¹⁵² The number of foreign students in Korea was much lower, but in order to entice Koreans back after their studies have ended, a series of “reverse brain drain” policies has been put in place. Among other benefits, these guarantee research autonomy to returning scientists and engineers, and provide financial benefits to returnees and their families.

Analysis of South Korea’s investment in higher education has found significant economic benefits. For 1986, Psacharopoulos found the private returns to investment in tertiary schooling were 18 per cent, compared with 10 per cent for secondary schooling. The social returns, he found, were 15.5 per cent (those for secondary education were 9 per cent).¹⁵³

¹⁴⁶ Ibid.

¹⁴⁷ UIS (2005) op cit.

¹⁴⁸ TFHE (2000) op cit.

¹⁴⁹ UIS (2005) op cit.

¹⁵⁰ <http://niied.interedu.go.kr>

¹⁵¹ Jeong Kyu-Lee (2004): “Globalization and Higher Education: A South Korean Perspective.”

Globalization 4 (1).

¹⁵² Sungho H Lee (1996): “The Academic Profession in Korea.” In Philip G Altbach (ed.) *The International Academic Profession: Portraits of Fourteen Countries*. The Carnegie Foundation for the Advancement of Teaching. Princeton, New Jersey: pp. 97–148.

¹⁵³ Psacharopoulos (1994) op cit.