

SPECIAL REPORT

African nations vow to support science

Policy-makers say that dependence on financial aid is hampering research, reports **Linda Nordling**.

Visitors expecting broken test tubes and threadbare carpets are often surprised by Kenya's Centre for Geographic Medicine Research in Kilifi. The gleaming white building, laden with top-notch equipment and perched atop a hill overlooking the azure Indian Ocean, is part of the Kenya Medical Research Institute (KEMRI), based in Nairobi, but would look at home in California or Singapore.

World-class laboratories are not common in Africa, but they are becoming less of an exception. There is a whiff of a scientific renaissance in the air, with new labs mushrooming in the capitals of Kenya and Uganda and local researchers taking the helm of formerly Western-run institutions.

The improved conditions carry a cost: continued dependence on foreigners, who foot most of the bills. "If you look at any of the researchers who carry out any significant research in Africa, 99.9% of their funding comes from outside," says Tom Egwang, a Ugandan immunologist and founding director of Uganda's Med Biotech Laboratories, headquartered in Kampala. "I really think that all these programmes are killing African science."

Others agree that the millions flowing from philanthropists, non-governmental organizations (NGOs), aid agencies and traditional research funders into African science are undermining efforts to convince African governments to spend money on research. "Governments don't assume their responsibilities in this area, simply because the NGOs spend money in their place," says Ahmadou Lamine Ndiaye, vice-president of the National Academy of Science and Technology of Senegal.

Dependence on international aid causes big problems for African scientists. Projects can be interrupted when grants run out, and the research agendas are set by donors rather than by African researchers and policy-makers. "Donors have their own priorities, and I don't think they would be able to provide all the resources that Africa needs," says Aida Opoku-Mensah, director of the information technology, science and technology division of the United Nations Economic Commission for Africa. "There needs to be a mind shift in African countries."

Several new efforts are under way to tackle the problem. This



PhD students investigate malaria proteins at Kenya's Centre for Geographic Medicine Research.

J. OKANGA/WELLCOME IMAGES

March, African science ministers resolved that 2011 would be the start of an African decade for science, promising increased research budgets and attempts to use science and technology to drive development. A small, continent-wide research-grant programme, modelled on the European Union's framework programmes, is in the works, as is a pan-African training network for researchers undertaking PhDs. And

donors and governments alike are talking up the need for more home-grown funding for research and development.

Going local

This week, the African Science, Technology and Innovation Endowment Fund will be launched at a Science with Africa conference in Addis Ababa, Ethiopia. Businesses — a rare source of investment in research and development in Africa — will be invited to add to the fund, which will provide innovation guidance and financial support for researchers and entrepreneurs. Several companies have already promised to contribute to the fund, including Nigeria's Zenith Bank and Bank of Industry, Zemen Bank in Ethiopia, and Ethiopian Airlines.

In most African countries, private-sector research funding is small compared with government budgets, and only US\$500,000 has been committed to this fund so far. This

A MODEST RESEARCH BASE

Small increases in science investment in Africa are being outstripped by growth around the world, leaving African research poorly funded by comparison.

	GERD* per researcher (thousand PPP\$)†		Researchers per million inhabitants	
	2002	2007	2002	2007
North America	204.8	251.0	4,527.3	4,654.3
European Union	176.1	194.7	2,420.3	2,727.7
Japan	167.3	207.9	5,071.6	5,548.1
China	48.7	73.7	629.1	1,071.3
Sub-Saharan countries‡	57.1	64.1	51.3	60.3

*GERD, gross annual expenditure on research and development. †PPP\$, purchasing power parity, US\$. ‡Excluding South Africa.

SOURCE: UNESCO


AFRICA'S NEXT TOP HOMINID

Ancient human relative could walk upright.

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Y. HAILE-SELASSIE ET AL./PROC. NATL ACAD. SCI. USA

SOURCE: IFAKARA HEALTH INSTITUTE

amount must double before the fund can issue the first round of research support, envisaged to be \$100,000. "We feel that it is time to engage with the private sector," says Opoku-Mensah.

Yet the problem does not rest simply in a lack of resources. *Global Research Report Africa*, published by Thomson Reuters in April, shows that the continent's wealthy nations, including oil producers such as Nigeria and Angola, generate fewer internationally recognized papers than many of their poorer neighbours when the sizes of their economies are taken into account. Although these countries could afford to put more funding into their universities, the money often goes into overseas accounts or is spent on imported goods rather than being invested domestically.

Moreover, most African governments have more pressing priorities than funding science, says Malcolm Molyneux, a professor of tropical medicine at the University of Liverpool, UK, who headed the Malawi-Liverpool-Wellcome Trust Clinical Research Programme, based in Blantyre, for 13 years. "When a country is manifestly inadequate in every compartment of its responsibilities in education, health and agriculture, it's difficult to pontificate that more should be spent on research when there is a possibility of this being acquired from outside," he says.

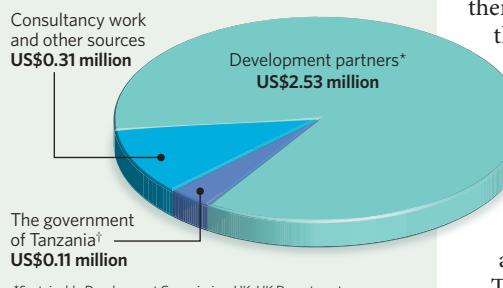
Hard habit to break

African countries produce plenty of research papers, although many appear in local journals. Those published in internationally visible journals are often produced in collaboration with researchers in other countries — and focus on areas such as public health and agriculture. But African contributions can be substantial, as *Global Research Report Africa* reveals. Between 2004 and 2008, Nigerian scientists were co-authors on nearly 1% of agricultural science papers published in international journals, and Kenyans co-authored nearly 0.5% of the world's immunology papers and more than 0.3% of environment/ecology papers. Overall, scientists across the whole of Africa publish about 27,000 papers in international journals per year, which is only about the same volume as the Netherlands, although the African number has doubled since 1998 (see 'A modest research base').

The reliance on funding from foreign donors can, however, make it difficult to coordinate research activities within a country and to ensure that research priorities match development priorities. "In defined segments there is visible progress," says Mark Rweyemamu, executive director of the Southern African Centre for Infectious Disease Surveillance in Morogoro, Tanzania. Yet Africa also needs

DONOR DEPENDENCY

The Ifakara Health Institute in Tanzania receives most of its funding from international aid donors.



*Sustainable Development Commission, UK; UK Department for International Development; and Irish Aid
†Ministry of Health and Social Welfare; and Ministry of Communication, Science and Technology

engineers, meteorologists and chemists.

Undoing the dependency that has become ingrained in many of the continent's research institutions over decades will not be easy. Centres that started their life as field offices for researchers from developed countries might have 'gone local', but they continue to depend on their old patrons for money.

The continent's most influential institutions, with scientists who have contributed to top-cited papers, are overwhelmingly reliant on donors. For example, KEMRI depended on international partners for two-thirds of its income in 2006–07, the last year for which an annual report is available. The Ifakara Health Institute in Tanzania expects to receive 3.72 billion shillings (\$2.53 million) from international development partners in 2010–11, compared with just over 150 million shillings from the country's government (see 'Donor dependency'). Similarly, the University of Malawi's College of Medicine in Blantyre and the University of Ghana, based in Accra, both produce internationally recognized research — and depend on foreign donors for equipment, training and research funding.

African science ministers have tried to remedy the situation before. In 2005, when the G8 countries pledged to double aid to Africa by 2010, they urged that some of it be used to build up African research, with African governments taking the lead. The governments, for their part, agreed in 2007 to increase funding for science and technology and urged one another to direct 1% of their gross domestic product (GDP) to these areas by 2010.

The statistics will not be ready for another two to three years, but Africa's failure to achieve this ambition is beyond doubt. Few believe that there have been significant improvements to the 2007 figures released by the United Nations Educational Scientific and Cultural Organization last year. These figures estimated sub-Saharan Africa's spending (excluding South Africa) to be 0.3% of GDP — the same figure as the continent clocked up in 2002.

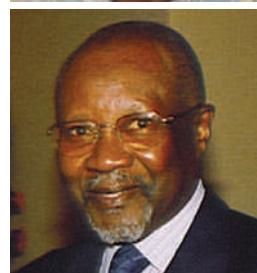
"Funding has grown a little, but the amount is not enough," says Ndiaye.

There are exceptions. Rwanda says that it has ramped up its science spending, although independent figures have yet to support this, and Tanzania's president, Jakaya Kikwete, has promised that the country will move towards the 1% of GDP goal. Meanwhile, the government of Uganda, flush from recent oil finds in the country's western parts, has also said that it wants to take more responsibility for funding science. It is not expected to renew the five-year, low-interest loan for \$33 million that it secured from the World Bank's Millennium Science Initiative in 2006. "The government has pledged to provide money that it would otherwise borrow from the bank," says Maxwell Otim, deputy executive secretary of the Uganda National Council for Science and Technology.

This time around, improved political stability on the continent augurs well for new investments in science. The Global Peace Index, published on 7 June by the Institute for Economics and Peace in Sydney, Australia, shows that the number of African conflicts and the availability of weapons decreased over the past three years, while cross-border relations improved. And although aid for Africa is being slashed as a result of the ongoing financial turmoil in rich countries, Africa's economies are expected to grow by 4.5% this year and by 5.2% in 2011, according to the Organisation for Economic Co-operation

and Development's *African Economic Outlook 2010*, published last month.

The continent is the world's poorest, and its science performance trails that of other developing regions. But viewed in the light of a progressively safer and more prosperous Africa, the current donor dominance could be a short-lived phase, says Molyneux. "It does not have to be like this forever," he says.



Tom Egwang (top) and Ahmadou Lamine Ndiaye say that foreign investment is hurting African research.