



SCIENCE FOR AFRICA

by John Mugabe

The barriers to the continent's scientific and technological development need to be removed if Nepad's goals are to be realised.

Africa entered this millennium with renewed determination to secure its sustainable development. After many decades of economic and social marginalisation, political instability and conflicts, over-dependence on the rest of the world for knowledge and finance, the continent and its people are now, more than ever, determined to eradicate poverty and to be fully integrated into the global knowledge economy. Their leaders have set ambitious but realisable sustainable development goals. These are embodied in a new framework: the New Partnership for Africa's Development (Nepad).

The creation and evolution of Nepad is a clear manifestation of the determination of African leaders to institute measures to increase agricultural production and food security, stem environmental degradation, improve infrastructure and communications, fight disease, end conflicts and wars, and increase industrial production. In addition to setting the Nepad agenda, African leaders have subscribed to the United Nations Millennium Development Goals (MDGs) and their targets.

Realising Nepad goals and the MDGs will require science and technology. Indeed science and technology play a central role in meeting human development needs while maintaining the integrity of the natural environment. There is an explicit correlation between a country's scientific and technological status and its economic performance and affluence, and indeed the gap between poor and rich countries in terms of real income is largely accounted for by differences in the accumulation and utilisation of science and technology. Closing this gap will require deliberate measures to build the scientific and technological capabilities of the poor countries. In the past, African countries have not done much to harness science and technology for their development. This is demonstrated by the continent's enormous developmental challenges. It is largely a result of the following factors:

First, in most countries of the region there are weak links between science enterprises and political institutions. Political organisations in the region have not accorded science and technology much attention in their manifestos and parliamentary activities. Technological change is a complex process that is influenced by many political factors. To engage in and manage this process, countries require the support of high-level political institutions. These institutions often determine the nature and levels of resources that go into public research-and-development activities and the overall governance of science and innovation. Thus there is a need to build strong political constituencies for science and technology development in Africa.

Second, most African countries formulated their science and technology policies in the 1970s and 1980s when development imperatives and technological opportunities were difficult. Many of the policies are focused on organisational aspects and not on programmatic issues. Countries have, for the last few years, been preoccupied with the creation of commissions or secretariats to promote science and technology, and have paid little attention to long-term programmatic aspects of science and technology development.

These commissions and secretariats have emerged to give administrative outlook to the role of science and technology in national affairs but they have never really built the necessary programmes to anticipate and respond to emerging scientific and technological developments. Some of these institutions have, over time, lost touch with the reality that it takes more than administrative oversight to promote science and technology development.

Third, African countries have devoted considerably low, and in many cases declining, funding to research and development (R&D). Most of them spend less than 0.5% of their Gross Domestic Product (GDP) on R&D. This is despite the declaration in the Lagos Plan of Action, and in national science and technology policies, that each country would allocate at least 1% of its GDP to R&D activities.

In such economic areas as agriculture, funding to R&D has declined drastically in the last decade or so to the extent that the region's ability to achieve and sustain food security is being impaired. The low and declining expenditure on R&D is a manifestation of the low priority that countries have given to science and technology.

Fourth, associated with the above three factors, there is declining quality of science and engineering education at all levels of educational systems in Africa. Student enrolment in science and engineering subjects at primary, secondary, and tertiary levels is also falling. These developments undermine the continent's aspiration to build up its numbers of scientists, engineers and technicians.

Fifth, Africa is losing some of its best scientific and technical expertise to other regions of the world. The number of African scientists and technicians who are leaving the continent for employment abroad is growing. This "brain-drain" is caused by a variety of factors including poor research infrastructure and poor remuneration packages. While other regions such as Asia have developed and adopted strategies to utilise their diasporas, Africa lacks such measures. The region can no longer afford to ignore this capital – African scientists and technicians abroad. It needs to design ways to tap and use the enormous scientific and technical talents of Africans abroad for its own scientific and technological development.

Sixth, another challenge faced by African countries relates to strengthening and building institutions dedicated to scientific and technological innovation. As a result of the above factors, R&D institutions in many countries are growing weaker. Most countries have not organised and mobilised their institutions in such ways as to use efficiently their scarce financial and human resources in specific fields of scientific and technological development. They tend to spread their resources thinly across the institutional terrain. The region as a whole has not been able to establish "centres of excellence" in such areas as biotechnology, space science and information and communication technologies (ICTs).

Seventh, generally, there are weak links between public R&D institutions and industry. Research results of public R&D activities are not often used by local industries, particularly small- and medium-scale enterprises (SMEs). In many cases there is a mismatch between R&D activities and national industrial development goals and strategies. For example, while the industrialisation policies of most African countries have put an emphasis on building and strengthening SMEs, scientific R&D institutions have weak links to these enterprises.

Sources of optimism and action

African policy-makers and politicians have recognised that the barriers to the continent's scientific and technological development need to be removed if Nepad goals are to be realised. They have embarked on a collective effort to establish foundations for science and technology. This began in November 2003 at the first Nepad ministerial conference on science and technology. The conference generated specific commitments and actions described below.

The first is the establishment of the African Ministerial Council for Science and Technology. This is a high-level forum that has started to examine and discuss emerging science and technology questions and their implications for Africa's sustainable development. It provides policy and political guidance on the development and application of science and technology in Africa.

The second major set of actions pertains to the creation and strengthening of networks of centres of excellence in scientific and technological innovation. These include the establishment of the Nepad Biosciences Network of Centres and the African Laser Centre.

The Nepad Bioscience Centres of Excellence is a new initiative to support African countries in developing and applying bioscience research expertise to produce technologies that help poor farmers to improve agricultural productivity. Nepad has been instrumental in mobilising resources to upgrade and link world-class laboratories in East and Central Africa. A similar effort has been initiated for Southern Africa. The laboratories will be dedicated to research and innovation in such areas as genomics and proteomics.

The African Laser Centre is a network of relatively large facilities dedicated to research and training in laser technologies. It comprises the National Laser Centre (Pretoria, South Africa), University of Cheikh Anta Diop (Dakar, Senegal), Laser and Fibre Optics Centre (Cape Coast, Ghana), National Institute of Laser Enhanced Science (Cairo, Egypt), Tunis el Manar University (Tunis, Tunisia), and Advanced Technologies Development Centre (Algiers, Algeria). These facilities specialise in materials processing, atomic and molecular physics, agricultural and environmental sciences, medical applications of lasers and manufacturing. In addition to the above efforts, African countries have also committed themselves to improve science, technology and innovation policies. Specific actions they are undertaking include the establishment of

an advisory panel on biotechnology, a working group to design common African indicators or benchmarks to continuously assess the status of science and technology, and a task force to promote African women's participation in science and engineering.

The countries have also committed themselves to increase their national annual public expenditure on R&D to at least 1% of GDP. These efforts will be bolstered with the proposed establishment of a continental financial mechanism for regional research and innovation programmes.

On the whole, there are now concerted efforts to promote science and technology in Africa. Political and civil constituencies for science and technology are emerging. African leadership has pronounced its commitment to ensure that science and technology are harnessed and applied to promote human development and the continent's integration into the global economy. What is needed are measures to sustain and enlarge these developments. The continent is not willing to remain burdened by its growing human deprivation and marginalisation from the rest of the world. ●

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