

ROBERTO BARNABA



## Give the new generation a chance

Romain Murenzi wants more young scientists in the developing world to be given the same opportunity to build careers that he was.

In 1982, I was a 23-year-old high-school teacher recently graduated in mathematics from the National University of Burundi, but I dreamt of earning a PhD in mathematics and physics and a professorship at a major university.

I applied for a 'Bourse du Tiers Monde' from the Catholic University of Louvain in Belgium, but was rejected. One reviewer said: "He is a refugee from Rwanda. If he comes to Europe for a PhD he will never return. Africa will lose an excellent high-school teacher."

The response was both complimentary and inadvertently dismissive, suggesting that both I and Africa would be better off if I stayed put. I applied again the following year, and was selected. Since then, I have held various university and research posts in both Europe and the United States, and from 2001 to 2009 I had the honour to serve as minister of education, science and technology of Rwanda.

I have been thinking about my personal journey lately. In April, I became executive director of TWAS, the academy of sciences for the developing world. The academy, which is administered by the United Nations Educational, Scientific and Cultural Organization and funded by the Italian government, is dedicated to building scientific capacity and excellence in developing countries.

Part of the TWAS mission is to address the needs of young scientists. And although I hesitate to draw general conclusions from an individual case, this tempts me to compare my own experience (and those of my colleagues a generation ago) with the situation today.

First the good news. It is highly unlikely that reviewers would suggest a promising fellowship applicant should not move. Brain drain is now seen as best addressed without compromising an individual's desire to reach his or her full potential.

Also, there are many postgraduate and postdoctoral programmes, increasingly based on collaboration between the traditionally poorer countries of the Southern Hemisphere. TWAS alone offers more than 300 fellowships each year, sponsored by Brazil, China, India, Kenya, Malaysia, Mexico, Pakistan and Thailand.

But we cannot close our eyes to aspects of science in the developing world that have not changed fast enough. First, there is the growing gap between countries that are rapidly strengthening their scientific capacity and those that lag behind. Just six developing countries account for three-quarters of the scientific articles published by scientists

world. Clearly, such imbalances have serious implications for scientists — and especially for young scientists — in countries that are failing to keep pace. Second, even for countries in which scientific capacity is growing, there remains a yawning gap between science and innovation. This has particularly serious implications for poor developing countries, where politicians need to regard sustained investment in science as a way of reducing poverty and increasing wealth.

I believe that three major steps must be taken to help countries stymied by poor scientific and economic capacity.

First, provide adequate training for the next generation of developing-world scientists. Without a critical mass of professors with PhDs, and doctorate-level research, there is no way that scientific capacity can be built, let alone flourish.

Second, expand opportunities for scientific exchange with colleagues in technologically advanced countries. Growing numbers of fellowships are available, yet the total number remains small. Too many eager and able young scientists in developing countries continue to be denied opportunities.

And third, young scientists from developing countries must be given broader opportunities to obtain research funds to continue their studies. Again, levels of funding are increasing, but not rapidly enough to meet the growing demand. Part of this funding can be derived from foreign donors, but part must come from the countries themselves.

Rwanda spends 1.6% of its gross domestic product on science and technology. This benefits a wide range of institutions, including the National University of Rwanda in Butare and

the Kigali Health Institute. To boost tertiary education in science even further, 70% of the loans available for higher education are reserved for students majoring in disciplines related to science and technology. Furthermore, Rwanda's efforts have drawn help from governments and funding agencies from across the globe.

Global financial institutions and bilateral development agencies must devise more comprehensive strategies to integrate science and technology into their development efforts. And the governments of scientifically lagging countries must create and pursue policies centred on long-term capacity building in science, technology and innovation.

With most of the world's young people coming from the developing world, the future of not just poor countries but the entire world will depend on support for its young scientists. It is vital that university graduates there are given the same opportunity that I was. ■

Romain Murenzi is the executive director of TWAS, the academy of sciences for the developing world, in Trieste, Italy.  
e-mail: edoffice@twas.org

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