

## **The Importance of Internet Communication Technology for Least Developed Countries**

Opening talk to the 12th CAS-TWAS-WMO Workshop Forum:  
'Operational oceanography for developing countries'

*By Romain Murenzi  
TWAS Executive Director*

Ladies and gentlemen, good morning! I am very pleased to see you here – so many good scientists, from so many nations. I must thank my colleagues and friends at the Chinese Academy of Sciences and the World Meteorological Organization for joining us again this year in organizing this workshop forum. Special thanks to Prof. Wang Hui-Jun, director general of the Chinese Academy's Institute of Atmospheric Physics, and to Jiang Zhu, the Institute's deputy director. I know they and the Institute's staff have worked very hard to prepare an excellent workshop, and I appreciate their great generosity.

I am the executive director of TWAS – The World Academy of Sciences. Thirty years ago, TWAS was founded as the Third World Academy of Sciences. Though our name has changed, the Academy's mission through three decades remains unchanged: We are committed to building science and engineering in the developing world. We are not a large organization, but we have many proven ways to support capacity building. We offer more than 500 Fellowships each year to young scientists seeking their PhDs or postdoctoral research opportunities. Our awards and prizes honour the best science in the developing world – and, truly, our winners are among the best scientists in all the world. We provide research grants and support for international science meetings in developing countries. And we engage with educators and policymakers at the highest levels, both in the developing world and the developed world.

At TWAS, we believe that when developing nations advance in science, engineering and technology, that has profound benefits not just for science, but for people everywhere. We consider science and technology especially important for the advancement of Least Developed Countries.

I must make an important point: Virtually all of our work is done in collaboration with partners. This workshop offers a perfect example. We have had a long and productive relationship with the WMO. Just this year, our organizations reached an agreement that WMO will cover transportation costs for up to 10 full-time postgraduate fellows each year studying in fields such as climate change and disaster risk reduction. Similarly, our relationship with the Chinese science community, and the Chinese Academy of Sciences, is well established and deeply important to TWAS and our mission.

At the start of this year, Prof. Bai Chunli took office as the president of TWAS. He also is the president of CAS. Soon after he began working with TWAS, our organizations established the President's Postgraduate Fellowships. Under this programme, up to 140 students per year from the developing world will be sponsored to travel to China for up to four years' of PhD study and research. Also this year, CAS made a significant new investment in five CAS-TWAS Centres of Excellence, all based here at CAS.

- The Centre of Excellence for Climate and Environment Sciences, hosted by CAS Institute of Atmospheric Physics
- The Water and Environmental Centre of Excellence
- The Centre of Excellence on Space Technology for Disaster Mitigation
- The Centre of Excellence on Green Technology
- The Biotechnology Centre of Excellence

Over the 30 years since TWAS was founded, it has played a significant role building science and engineering in the developing world. Indeed, what we have witnessed – what we are witnessing today – is a global transformation. In 1983, if you had talked to world leaders about the importance of science for development, few would have taken you seriously. But today the idea is widely accepted. And we see the results: China, Brazil and India are transforming themselves through investment in research and science education. And many other nations are following the same course – including my own country of Rwanda.

And yet, the transformation is uneven. While some countries are advancing, others are lagging. These are the Least Developed Countries, home to nearly 900 million people. And in most cases, the transformation has barely touched them. TWAS counts 49 Least Developed Countries in the world – and 31 of them are in Africa.

LDCs are defined by their poverty, high levels of illiteracy, poor health, relatively low levels of education, and related conditions. The average per capita annual income of LDCs in 2012 was about USD750. And where investment in research and development is approaching 2% of gross domestic product in some developing countries, in LDCs it has been stagnant at about 0.1%.

For TWAS, one of the central challenges is to find a way to help LDCs build a foundation in science... build momentum... build confidence. We really believe that in a poor country, one scientist with a master's degree can make a difference. Even better, one PhD. That is the importance of our Fellowship programmes with CAS and WMO.

But still, there are challenges beyond training a corps of scientists.

At the Institute of Atmospheric Physics, and at all of the CAS-TWAS Centres of Excellence, there is a significant focus on computing, data analysis, and data-sharing. This is certain to become even more important in years ahead. I'm sure you know this from your work as oceanographers. You aren't merely studying the health of fisheries or the effects of climate change on oceans. You are gathering data... processing data... sharing data... storing data. You need that data to build simulations and models that are crucial to understanding how oceans work.

But then I come to a most difficult issue: We have all read that access to cell phones and smart phones is growing at an amazing rate in many developing countries, even the poorest countries. But if you are a scientist in an LDC, if you are an oceanographer... What is your access to high-speed broadband? How much does it cost? Do you have access to powerful supercomputers that sift and analyse data? How can you store these massive quantities of data? And how do you share it with your colleagues in other nations – or with colleagues in your own country?

Every year, the International Telecommunications Union publishes 'Measuring the Information Society', a study of Internet and computing technology, or ICT. The data in the

2012 report suggest ICT poses a profound structural challenge for the world's Least Developed Countries.

- Mobile broadband subscriptions are soaring in the developing world. But the growth is much slower for fixed broadband subscriptions – desktop computers. Only about 5% of people in the developing world have access to the Internet on a fixed computer.
- Smart phones are good. But fixed computers are important: They're faster and stronger. They're more useful by far when you need analytical power.
- About 70% of people in the developing world use the Internet. But in the developing world, less than a quarter do.
- 70% of people under 25 in the developing world do not use the Internet yet.
- Broadband connections in the developing world tend to be much slower than in the developed world, and that limits access to the type and quality of applications and information. And yet broadband costs are much higher in the developing world.

The authors of this report have a country-by-country index of ICT development. It offers a clear picture: Of the 40 countries that rank lowest on the index, 31 are LDCs. 29 of them are African countries. And the 13 countries that ranked lowest for ICT development are all African.

This statistic is especially troubling: The ITU's Broadband Commission report has found that in 19 of the world's least developed economies – mostly in Africa – the monthly cost of broadband exceeds average monthly earnings.

The conclusion is clear: If you're an LDC, and you don't have computers and affordable broadband, then how can you participate in science? Even if you can gather data, how do you analyse it? How do you store it? How do you share it with colleagues? The risk is that, while other countries advance, the LDCs only fall further behind.

When you see the people in this room and the countries they represent, it's clear that this is an important event. It is a chance to take information and ideas home and to share them, and later to build on them.

But we need to be thinking also about how, in the long-term, we build capacity in computing and data analysis. And we need to be aware that, when we do that, it will dramatically improve our ability to advance the science of oceanography, and to advance science across many other fields, as well.