



# THROUGH THE YEARS AT TWAS

MOHAMED H.A. HASSAN, TWAS'S LONG-TIME EXECUTIVE DIRECTOR, RETIRED AT THE END OF MARCH. ROMAIN MURENZI (TWAS FELLOW 2005), THE FORMER MINISTER OF SCIENCE AND TECHNOLOGY IN RWANDA, WILL REPLACE HIM. IN THE FOLLOWING ARTICLE, HASSAN LOOKS BACK AT HIS 25-YEAR CAREER WITH TWAS. HE ALSO OUTLINES SOME OF THE MAJOR CHALLENGES THAT HE BELIEVES THE ACADEMY WILL FACE IN THE YEARS AHEAD.



*As I think about my tenure as TWAS executive director, I find it hard to believe that my first trip to Trieste took place in 1974. At the time, I was travelling across Europe. I had just earned a doctorate degree in mathematics from the University of Oxford in the UK and I had just begun my career as a lecturer in mathematics at the University of Khartoum.*

**I** was also assisting my father who owned (and still owns) a number of businesses in Sudan that depend

on suppliers in Europe. It was business, not science, which prompted my journey.

My side trip to Trieste, a beautiful port city nestled against the Adriatic Sea in the northeastern corner of Italy was, in fact, just that. The trip was not essential but instead driven by curiosity. I dearly wanted to see the International Centre for Theoretical Physics (ICTP). Launched in 1964, ICTP had emerged as an intellectual oasis for scientists from across the developing world. I also hoped to

speak to the Nobel Laureate Abdus Salam, ICTP's founding director and an iconic figure in science, especially in the South.

To my delight, I was able to do both. As I boarded the train to head to the airport and to begin my journey back home to Sudan, I gazed out the window at the city and the sea. I remember thinking that I won't soon forget this wonderful experience. I cherished the moment.

In 1976, I returned to Trieste as an ICTP Associate. In 1983, Salam



asked me to work with him in helping to launch TWAS. I seized the opportunity. I was young, eager and perhaps a bit naive. I thought I would go to Trieste for a year or two to see what would happen. I had no idea that TWAS would become my life's work.

Today, as I look across the ICTP campus from my hillside office and down to the sea below, I see many changes. There is the expansion of ICTP itself, which now attracts more than 5,000 scientists each year to attend research and training courses, workshops and seminars at its facilities in Trieste. There is the addition of the Fermi Building, which serves as the home of TWAS. And there is TWAS itself, which now has nearly 1,000 members and oversees a broad range of programmes that are intended to honour and promote science in the South.

But as much as TWAS has changed, the world of science in the developing world has changed even more. When TWAS first became operational in 1985, China was just opening its doors to the outside world, India was experiencing slow economic growth that was failing to keep pace with the needs and aspirations of its people, Brazil remained under the authoritarian hand of a military government and South Africa was shackled by apartheid.

Today, each of these countries is recognized as an emerging economic power with broad areas of scientific excellence that increasingly compare to the level of competence found among developed countries. Other developing countries, including Chile, Malaysia, Mexico and Turkey, to name just a few, have also placed science at the centre of their development efforts – with encouraging and, in some cases, even remarkable, results. From this perspective, the future of the developing world looks bright.

I often think about those early years: the writing of the statutes for TWAS, the organization of the foundation meeting with the academy's first 42 members in 1983, and the writing of letters to potential donors.

I remember trying to enlarge the pool of potential candidates for TWAS membership by speaking with newly elected TWAS members about colleagues whom they knew to be outstanding scientists; by reviewing the roster of scientists elected to science academies in the North who came from the developing world; and by identifying prominent scientists who travelled to

ICTP to participate in the Centre's research and training activities.

I remember the joy and satisfaction that everyone associated with the academy felt in 1985 when the Italian government announced that it would provide TWAS with an annual grant of USD1.5 million – a generous contribution that ensured the academy's long-term survival and that enabled TWAS to launch its research grants, fellowships and prize programmes in earnest.

I remember witnessing similar expressions of pride and enthusiasm in 2004 when the Italian government passed a parliamentary law that transformed the funds that Italy gave to TWAS from a "voluntary" to a "permanent" contribution that would no longer be subject to yearly reviews. I learned about this good news the same day that China's President Hu Jintao spoke to more than 3,000 people attending the opening ceremony of the TWAS 20th anniversary conference in the Great Hall of the People in Beijing. The Italian government's decision to provide TWAS with a permanent source of funding, combined with President Hu's high praise for the accomplishments of TWAS that he presented to such a large and distinguished audience, made this one of the most memorable days in the academy's history.

I think about other turning points too that may have been less dramatic but no less important to the success of TWAS. I recall, for example, the academy's decision to focus on South-South collaboration in science at a time when developing countries looked exclusively to

the North to build their scientific capacity.

TWAS's emphasis on South-South collaboration may have failed to pay significant dividends in the short term (at the time, there were simply too few scientists and too few scientific institutions of excellence in the developing world to forge meaningful collaborations).

Yet, over the long term, TWAS's early call for scientific partnerships and exchanges among developing countries gave the academy lasting credibility as one of the world's strongest and most forthright "voices for science in the South." This has generated untold benefits not only for TWAS but, more importantly, for science in the developing world.

Indeed South-South collaboration in science has both deepened and accelerated over the past two decades as scientific capacity has become stronger in a broad range of fields. The trend has spread across the South, creating fertile ground for fellowships, grants and joint research programmes among developing countries.

Then there's the decision by the governments of Brazil, China and India, in 2004, to collaborate with TWAS in funding fellowships for postgraduate and postdoctorate students from the developing world to study in centres of excellence in their countries. Today, the TWAS South-South fellowship programme, which has since been joined by a number of other countries including Kenya, Malaysia, Mexico, Pakistan and Thailand, now offers more than 350 fellowships each year. It is the

largest South-South postgraduate and postdoctoral fellowship programme in the world.

There's also the family of like-minded institutions that have joined TWAS over the years to make Trieste their home. For example, the Third World Organization for Women in Science (TWOWS, which has recently been renamed the Organization for Women in Science for the Developing World or OWSDW). The organization, which was launched with the help of TWAS in 1988 and which the academy has supported ever since, remained active but largely in a steady state for many years.

However, OWSDW has recently taken important steps to raise its profile and increase its level of activities. There are now more than 5,000 women scientists who belong to OWSDW. That makes it the world's largest organization of women scientists.

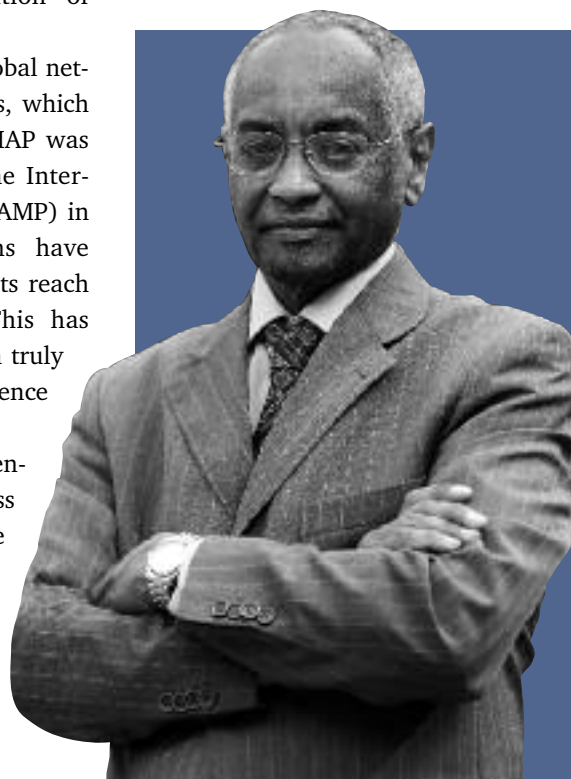
There's also IAP, the global network of science academies, which came to Trieste in 2000. IAP was subsequently joined by the Inter-Academy Medical Panel (IAMP) in 2005. Both organizations have allowed TWAS to extend its reach from South to North. This has helped give the academy a truly global presence in both science and science policy.

Over the past quarter century, a great deal of progress has undoubtedly been made in building scientific capacity in the South. Yet, it is equally true that more work needs to be done if the goal of having "good

science in all countries," as TWAS president Jacob Palis likes to say, is to be achieved.

I am, of course, proud of the contributions that TWAS has made to this effort. But I also know that my successor, Romain Murenzi, will continue to face a broad range of challenges that are no less daunting than those that the academy has confronted in the past.

As the *UNESCO Science Report 2010* noted, the North-South gap in scientific capacity, at least in aggregate terms, is slowly closing. From 2003 to 2007, the share of scientific articles published by scientists from developing countries in peer-reviewed scientific journals has climbed from 20% to 25%. This is undoubtedly welcome news. It speaks to a more equitable world and to a world with a larger, more diverse, scientific pool of expertise.



But a closer look at the statistics reveals a less glowing portrait of the state of science in the developing world. An estimated 80% of the increase in publications in peer-reviewed journals authored by scientists in the South comes from just a handful of countries: Brazil, China, India, Malaysia, Mexico, South Africa and Turkey. China alone is responsible for one-third of the developing world's scientific output.

TWAS, in fact, has identified some 80 developing countries that

enjoyed by emerging economies. This is indeed welcome news. China's 10% annual growth rate over the past 25 years has lifted some 600 million people out of poverty, marking the most rapid pace of poverty alleviation in the history of humankind. Just last year, China's economy leaped passed Japan to become the world's second largest economy. India, which has experienced annual growth rates ranging from 5% to 10% over the past two decades, now has more than 300

mixed with darker hues of grey. For example, the average expenditures on science and technology among sub-Saharan Africa's 48 countries are well below 0.5%. In Burkina Faso, Congo, Lesotho and Zambia, it is lower than 0.1%. Low percentages also prevail in countries with predominantly Muslim populations.

But equally disturbing, as overall economic growth of many developing countries has increased, so too has economic inequity. India, for instance, has more people liv-



continue to lag far behind the rest of the world in their scientific capacity and output – so-called “scientifically lagging” countries. With a collective population of 1.6 billion people, these countries account for less than 1% of the world's scientific publications.

Thus, for all of the progress that has been made, we have, in a sense, traded a North-South divide in science and technology for a South-South divide.

And what is true of science, not surprisingly, is also true of economic development. Again, much attention has been focused on the rapid pace of growth now being experi-

million people who enjoy middle-class income status. The annual per-capita gross domestic product (GDP) in Brazil, meanwhile, climbed from USD8,700 in 2005 to USD11,200 in 2010.

Science and technology has played a prominent role in the economic success of each of these countries, a role well recognized by the political leadership. Brazil now spends more than 1% of its gross domestic product on science and technology; China spends 1.5%; and India about 1%.

But again a closer look reveals a much more complicated picture in which the bright colours of hope are

ing in extreme poverty – on less than USD2 a day – than all of sub-Saharan Africa. In China, income inequality has increased dramatically even as the country has quadrupled its GDP over the past decade.

TWAS has always supported efforts to build scientific and technological capacity in developing countries as a necessary prerequisite for improving global social and economic well-being. But, at the same time, it has always been keenly aware of the modest contributions it can make to this effort. TWAS, after all, is a small organization with a small staff and limited budget.

The same sense of reality will undoubtedly guide the agenda of the new executive director as he takes over the reins of the organization. However, I would like to offer some suggestions, many of which have been outlined in the academy's strategic plan for 2010 - 2014, that could help TWAS remain a key player in global efforts to continue to strengthen scientific capacity in developing countries.

First, I think it is important to decentralize TWAS activities, largely by extending greater responsibility to the academy's regional offices.

world and the ability of neighbouring countries within the same region to pursue activities that are mutually reinforcing and beneficial.

Second, TWAS should seek to build upon its successful postgraduate fellowship programmes. These programmes currently offer 350 fellowships each year. However, less than half – some 160 fellowships – are actually awarded. It costs the academy about USD350,000 a year to cover the transportation costs for grant recipients and to administer the programme. This investment, in turn, leverages an estimated USD2.5

The question, then, is this: How can we secure the money we need to manage a possible three-fold increase in the number of awardees. The answer lies in launching an extensive fund-raising campaign highlighting how this programme could help ensure the next generation of well-trained scientists in the developing countries. Few issues are so critical to the future well-being of the South.

Third, TWAS should seek to reach its USD25 million target for the academy's endowment fund. The fund currently stands at USD15



It is unlikely that the core operating budget for the TWAS secretariat will increase in the future. Therefore the regional offices will need to shoulder greater responsibility for the administration of prizes, fellowships and research grants, especially as these efforts continue to expand. Indeed this trend has been unfolding for the past several years with the help of the secretariat. Such efforts, moreover, should not be viewed solely as an economic measure. Decentralizing the academy's activities reflects the growing strength of science in the developing

million from the host countries to cover tuition, housing and living costs.

If the academy were able to identify worthy candidates for each of the 300 fellowships that are currently available, the costs for TWAS would increase nearly threefold, reaching over USD1 million dollars. For the host countries, the costs would rise to more than USD5 million. There's no doubt that, if we could heighten awareness among students across the developing world, sufficient demand exists for these fellowships.

million and has been growing slowly largely as a result of the earnings that are being generated by the principal. The academy should reinvigorate its endowment fund campaign to help ensure that the USD25 million goal is met by 2020. As has been the case since the endowment fund was created in 1993, all contributions should come from developing countries and TWAS members.

Fourth, TWAS should seek to strengthen its position as one of the key voices for science in the South. To accomplish this goal, the acad-



emy should begin publishing at least one policy brief on a science-based issue of importance to the developing world each year. The briefs should examine these issues from the perspective of scientific communities in the South. In a similar vein, the academy should continue to encourage the development of the Consortium on Science, Technology and Innovation for the South (COSTIS), which UNESCO has agreed to host in partnership with the Paris office of the G77 + China. COSTIS holds great promise in forging close ties between science policymakers and the scientific community.

And fifth, TWAS should engage in a comprehensive study on how it can best position itself to meet the challenges posed by the rapid – indeed breathtaking – changes now taking place in science and society not only in the developing world but throughout the entire world.

As stated earlier, a much more complicated mosaic is emerging due to the progress that has been made in building scientific capacity in the developing world. The North-South divide in science and technology is narrowing. Yet, at the same time, domestic divides in education and economic well-being are widening in both developed and developing countries. Broad global problems such as climate change, the spread of infectious diseases, food and energy security and the loss of biodiversity not only need to draw on the knowledge and creativity of the global scientific community but also must be addressed in their global, national and local contexts. This will require training a new generation of scientists who are well versed not only in broad international scientific issues but also on how these issues are playing out in their own regions, countries and communities.

Therefore, if I could convey just one thing to the academy's new executive director, it would be this: Do not allow TWAS's reputation for promoting scientific excellence and its abiding concern for improving the economic and social well-being of the people of the developing world through science, to be compromised. It has been the academy's ability to serve as a beacon of excellence, helping to guide the developing world to a better future, that accounts for TWAS's success.

No organization owes its accomplishments to just one individual or even group of individuals. And so it is with TWAS. Whatever contributions the academy has made to science and society in the develop-

ing world have been due to a number of distinct, yet integrated, pillars of strengths to which I owe an enormous debt of gratitude: The academy's members, the academy's staff and the academy's leadership, led by TWAS's remarkable presidents: Abdus Salam, Jose Vargas, CNR Rao and, currently, Jacob Palis. I am also indebted to the academy's dedicated staff, many of whom have worked for the academy as long as I have. As TWAS's executive director, I have been the primary point of contact for the academy's many partners. But it is the work behind the scenes, done by the staff, which accounts for much of TWAS's success.

I have no doubt that my worthy successor, Romain Murenzi, will find a great deal of support in his efforts to move TWAS forward as it seeks to attain even greater success in the years ahead.

And, as for me, I am sure that I will continue to observe TWAS in the years ahead. Indeed don't be surprised if I turn up from time to time to participate in TWAS meetings and join in the discussions.

Let me conclude by offering my sincere thanks for allowing me to serve such a magnificent organization that has fulfilled so much of its promise, yet promises so much more. It's been the journey of a lifetime that has bestowed rich personal rewards and a sense of satisfaction for which I will be forever grateful. ■

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