# INTERNATIONAL News

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## Raising the level of science in developing countries

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The Abdus Salam International Centre for Theoretical Physics (ICTP), in Trieste, Italy, is a research center that has been mandated "to foster advanced studies and scientific research in developing countries." Despite its name, the mandate covers basic work in all areas of physical sciences including sustainable development. Scientific development is part of the overall development and the increased interconnectedness of the world today implies that it is dangerous for all of us to leave any part of it too far behind. Thus, the Center's mandate is more relevant today than when it was created a little over 40 years ago.

Perhaps a few words are useful on what a "developing country" means. Except for Western Europe, its recent extensions through the European Union, United States, Canada, Russian Federation, Australia, New Zealand, Japan and Israel, the rest of the world is classified by the United Nations as developing. About 70% of world's population belongs to this class. The quantitative basis for this classification is a human development index that measures not only per capita income but also social development through literacy, education, healthcare and life expectancy. By this compound measure, countries such as Saudi Arabia are regarded as developing despite their oil wealth. Taiwan, Hong Kong, Singapore and South Korea are shedding the label and a few countries such as Chile and Turkey are seeking an active transition.

There are big differences within the class of developing countries. The needs in Qatar are different those from those in Namibia, and China cannot be compared with Ethiopia. To make further distinctions, the phrase "least developed countries," or LDCs, is used for the poorest nations which cannot be regarded as developing by any measurable index. They include 10 countries in Asia, 34 in Africa, 5 small countries in Oceania, as well as Haiti. This is a large number of countries and includes too many people to ignore.

Given this diversity of development, what is ICTP's strategy? What determines how well, and how much, ICTP works with scientists in a given developing country?

We can state ICTP's aspirations in simple terms:

1. In those countries which already have some good institutions but the development is rather spotty (e.g., Cameroon, Ghana, Indonesia, Pakistan, Iran and Nigeria), we support carefully selected good scientists, in the most effective ways possible and with little bureaucracy. They form the nucleus of scientific excellence.

2. For smaller countries whose development is low, a long term goal is to establish a "few" decent institutions within their territories, with at least a small number of groups there having some international visibility.

This is not overly ambitious or utopian, but is already a tall order for ICTP to accomplish on its own. But ICTP can, and does, stimulate the process and its evolution: one of its strengths is that it knows most of the good scientists in those countries, in one context or another. More importantly, it can build the needed scientific capacity through its many programs.

For example, ICTP promotes the progress of science in LDCs not only by offering its own facilities but also by backing up institutions in those countries to network with others in their region. Among the Asian LDCs, ICTP has strong ties with Bangladesh and Nepal, although, despite some efforts, no connection exists with countries such as Myanmar and Afghanistan. Among the LDCs in Africa, we work reasonably well with countries such as Benin, Mozambique, Sudan and Uganda but less with others. The links with countries of the Oceanic region is poor. Perhaps understandably, ICTP has had strong ties with countries such as Argentina, Brazil, Cameroon, China, Egypt, Ghana, India, Indonesia, Iran, Malaysia, Mexico, Nigeria, Pakistan, Russia, South Africa, Sri Lanka, Turkey and Venezuela. In very rough terms, we are connected to all countries that show interest in science and are still in serious need of some aspect of development. Where some combination of interest, opportunity, potential and need is large, our Center's involvement has also been extensive. Where the needs are large but no infrastructure exists to take advantage of science, active involvement has been rather difficult.

Now that Taiwan, Hong Kong, Singapore and South Korea have broken out of the mold of developing countries, and countries such as Brazil, China, India, Mexico, South Africa and Turkey have made strong strides in science and technology in the last decade or so, ICTP can employ a new strategy for building S&T in their less developed neighbors. The latter group of countries combines areas of considerable development with aspects of neglect and decay; they are therefore well positioned not only to understand the main problems of development but also to do something concrete about them. They must take greater responsibility for increasing the level of science in countries in that region, and generate adequate capacity for making intelligent decisions on science and science policy. This emphasis is part of the new strategy of ICTP. I shall illustrate, through two of several examples, how ICTP has been enabling these large countries to discharge some of this responsibility.

(a) *Mathematics in Brazil and Latin America, Condensed Matter Physics in China and East Asia, and Information Technology in India and the South Asian region.* The plan is to utilize the powerful scientific resources of these big countries to organize high-level meetings, schools and workshops in the respective topics collaboratively and open them up for the rest of the region. Roughly speaking, the expenses for local participants and local expenses will be covered by the host country and travel for participants from other countries in the region will be covered by ICTP. What is new is not the organization of such activities–for instance, the Latin American String Theory School organized by ICTP has been going on for more than 8 years–but the commitment and the financial contributions from the major countries in the region.

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(b) *Material science and accelerator physics in South Africa and the rest of Africa.* This arrangement allows African scientists to work in South African laboratories and maintain long-term connection with them. The travel costs will be provided by ICTP and the subsistence allowances will come from South Africa.

ICTP has begun work on other fronts as well. It has begun to work with the optics network in Africa to raise the capacity of ICTP-affiliated institutions to offer advanced education and training to students and researchers alike; undertaken new initiatives in mathematics in East Africa; coordinated the role of expatriate Sri Lankan scientists in working with their country's scientists and scientific institutions; supported new institutes in South Korea and Pakistan. It has started to work on common programs on seismology in the earthquake-prone region that includes Iran and the Indian subcontinent, and on climate changes in Northern Africa and Mediterranean countries.

The goal again is to make available the expertise present in the larger countries of a region to all the others in that region. We hope that a large-scale interest in assisting science of neighboring countries will improve their political relationships as well. Sometimes, ICTP has been a good mediator in this regard.

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