nature neuroscience

Worldwide neuroscience

Emanuel Mora is exhausted, but happy. After eight intense weeks in the Neural Systems and Behavior course at the Marine Biological Laboratory in Woods Hole, he is returning to Cuba with the intellectual excitement common to many alumni of these summer courses—as well as several pieces of electrophysiological equipment that the course organizers have donated for his laboratory at the University of Havana. This scenario will be familiar to many scientists in developing and economically disadvantaged countries, where obtaining what is needed to do experiments often requires more effort than scientists elsewhere can imagine.

Unfortunately, creative use of limited resources can only go so far. Thus, several international societies have been working toward promoting neuroscience in developing countries in a more systematic way. These programs are very effective at attracting goodwill from their beneficiaries. However, to succeed in the long term, they must confront a number of practical issues, including how to provide appropriate training and how to encourage young scientists to return to their home countries after training despite the difficulties of doing research there.

Many research groups in developing countries lack modern equipment, but more importantly they often lack the expertise to use the equipment they do have. Researchers from developing countries and scientists who have visited them agree with Albert Aguayo, Secretary-General of the International Brain Research Organization (IBRO), that hands-on training in laboratory research is essential. Thus, a particularly effective approach to promoting science in developing countries, though certainly not the least expensive, lies in programs like Mora's fellowship, supported by the Society for Neuroscience's International Affairs Committee and the National Academy of Science's US National Committee, which make up the US/Canada regional committee of IBRO. In addition, IBRO (www.ibro.org) provides fellowships and grants that allow students to spend up to a year working in another country or to attend conferences. IBRO also brings prominent scientists into underdeveloped regions to spend a week or more giving lectures and workshops on neuroscience. These programs help young scientists to experience the process of designing and troubleshooting experiments, which is difficult if not impossible to learn from textbooks or published papers.

The danger, of course, is that it can be hard to entice scientists who have been exposed to a well-funded and equipped laboratory to return to (or remain in) their home countries. Researchers who have worked elsewhere may not be eager to go back to a country without an adequate system in place to allow them to continue a quality scientific career. Mu-ming Poo of the University of California, Berkeley, has been trying to address this problem head-on at his Institute of Neuroscience (ION) in Shanghai, China, which is approaching its fourth anniversary. With ten laboratories now and three more to be added this year, as well as a good publication record from the mostly returning Chinese investigators, the ION appears to be doing well—which Poo, who was not initially optimistic, finds encouraging. This year will also mark the ION's first test of its tenure review system, part of a merit-based career structure that Poo feels is essential for encouraging and promoting quality science.

Keeping abreast of the scientific literature is another essential part of maintaining a strong research program, but in many developing countries, where library budgets are limited or non-existent, this can be problematic. Initiatives like the Health InterNetwork Access to Research Initiative (www.healthinternetwork.org), which includes the Nature Publishing Group journals, are providing free or low-cost access to the literature for countries with a low per capita Gross National Product (US $3000 or less). Slow or limited internet access can also make it difficult to access materials online, and in response, the IAC-USNC has made its series of web lectures (www.iac-usnc.org) accessible as small files that are easy to download.

Ultimately for a country to have a strong science program, it must invest in its own research community. In some economically disadvantaged countries, this is not easy to justify in the face of more pressing needs. One answer is to encourage international collaborations. For example, the Human Frontiers in Science Program offers grants geared toward bringing international groups together. Although the primary applicant must be from one of the countries that contributes funds to the program, other members of the team can come from anywhere in the world.

Promoting science may be impossible in some countries that lack essential survival requirements or a sufficiently cooperative government. In some cases, basic infrastructure, such as mail delivery and electricity, may not be sufficient to support the needs of researchers. Internal corruption can also pose problems and some researchers tell stories of having to make under-the-table deals with officials to obtain grant money or supplies. These are problems that the international community is unlikely to be able to address. Aguayo emphasizes that to be effective, IBRO must focus in areas where there is a solid infrastructure already in place.

It may seem impractical or even wasteful to promote science in regions that are struggling with basic necessities, but attitudes like these can only contribute to political and social divisions between countries. Such thinking could even prove deadly. Local scientific responses to epidemics like the recent SARS outbreak are vital to understanding and controlling life-threatening illnesses that have major global impact. Developing countries contain a large percentage of the world's population. If their training and resource limitations can be overcome, they will undoubtedly have the potential to contribute a great deal to scientific progress. ■