

SCIENCE COMMUNITY

Scientific Diasporas

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In Canada, as in other industrialized countries, a high percentage of foreign-born residents are from the developing world (1). Some of these migrants are highly skilled scientists and engineers who constitute a “brain drain” from their countries of origin (COs), but also represent a scientific diaspora with enormous potential. Scientific diasporas have been defined as “self-organized communities of expatriate scientists and engineers working to develop their home country or region, mainly in science, technology, and education” (2). Unfortunately, many of these diaspora networks depend on a few champions for sustainability, and there has been evidence of Web site inactivity (3) and ineffectiveness (4, 5).

We believe scientific diasporas may represent part of the solution to the often crippling economic and social effects of emigration on the developing world (5). However, systematic, qualitative research into the needs and perceptions of the diasporas themselves regarding assisting their COs is lacking. Such information is essential to success of any future policies aimed at engaging them.

Using previously described qualitative research methods (6–8), we studied life science researchers and entrepreneurs during 2005 in three Canadian cities (Vancouver, Toronto, and Montreal) that represent strong science hubs. Participants in academic research centers and biotechnology companies were recruited by posting a study notice in which they were asked to identify themselves as originating from developing countries and to share their views about or experiences with contributing to development and innovation in their COs. Anonymity of participants has been maintained, as information on the national origin of individuals at the workplace is considered confidential. This method addressed concerns about potential harms of stigmatization that scientists from developing countries might face as a result of being identified by origin. Sixty participants were included, of whom 48 were from academia and 12 from the biotechnology industry. Participants were asked open-

ended semistructured questions during face-to-face interviews. Questions focused on three areas: linkages to the CO, barriers experienced or expected when forming linkages to the CO, and interest in participating in science and technology (S&T) capacity-building through an organized mechanism.

As might be expected, given the self-selection of participants, the general sentiment expressed by study participants was that of a feeling of moral responsibility or need to “give back” to their CO. Despite observing country-specific differences in the level of trust held by study participants toward their CO’s government, about two-thirds of all participants felt positively about working directly with the scientific communities that would benefit from their contributions.

Among the 60 participants, there was very little systematic S&T interaction with their COs. The participants could be divided into three broad categories: interested and/or concerned, leaders, and those who had experienced networks.

Forty-one individuals fell into the category of interested and/or concerned, of whom 25 had a strong desire to “help” but were not aware of any ready vehicles through which to offer assistance. When we asked why they had not initiated formal linkages, participants listed reasons such as lack of time, financial barriers, lack of infrastructure in their CO, or they said that no one, including their CO, had asked for their contributions. Some scientists said they were at a disadvantage because they were still in the process of building their careers in Canada. In one scientist’s words “I do not have the freedom (to initiate linkages) because I am not a principal investigator.” Other participants echoed this sentiment and said that even if they tried to initiate collaborations with their CO, they would not have credibility unless they held a high-profile position in the developed world. Finally, a common response among these participants was to look at the study notice as a “call for help,” and although the notice made no mention of this, they hoped they were being recruited for an existing program.

Nine individuals were actively engaged in

Scientists from the developing world who work in more developed countries are often underutilized resources and should be cultivated for the benefit of their countries of origin.

projects in or with their COs. They have contributed to S&T capacity-building in various ways such as serving a scientific advisory role in academic institutions, organizing joint research projects, organizing “traveling expert panels,” forming a transnational life-science company spanning Canada and the CO, and partnering with a Canadian company to help it enter his CO’s market. Among these leaders was an executive officer of a biotechnology firm, principal investigators in academic research centers, and a Ph.D. student. One of these participants was con-



tacted by a diaspora initiative based in his CO. However, he said he received few e-mails from this organization, and his evaluation was that “things start but they don’t finish.”

Ten individuals considered themselves to be members of an organized network. Four individual participants were part of two networks with S&T linkages to their CO. However, the networks described by six participants were new and undefined or not related to S&T capacity-building (i.e., had humanitarian or job market goals). One of these networks, AHEAD, has a mission “to explore, solicit, acquire and deliver educational materials that help advance education in Ethiopian universities and colleges” (9). Another, the Society of Chinese Bioscientists of America, has as part of its mission “to

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establish a spirit of fraternity and international cooperation" (10). One of the members of this network said: "right now, we do this because of personal connections ... we are mainly focused on science exchange."

A common belief was that Canada's position in international aid is well respected and that a government-backed diaspora effort would provide credibility when trying to make connections. More than half of our participants (32 out of 60) expressed a desire for some form of external support (financial and/or organizational), guidance, and credibility. When asked about how a hypothetical diaspora program could be most effective, participants indicated a need for (i) a platform that would allow them to participate in short-term visits to developing countries where they could provide "hands-on" science or entrepreneurial training; (ii) access to technology for "virtual" teaching (Web-based educational vehicles); (iii) grant-writing advice and mentoring; (iv) a mechanism to facilitate biomedical business partnerships between the diaspora in Canada and COs; (v) funding mechanisms for joint research projects between Canadian and developing country researchers; and (vi) policies that would help postdoctoral fellows spend time in their CO without harming their careers.

Recommendations

Scientific diasporas represent an untapped resource for their COs and their host countries, and both must become involved with the diasporas. The report of the Global Commission on International Migration concluded that COs should "establish an inventory of the skills base within the diaspora; develop programmes that facilitate the transfer of skills and knowledge from the diaspora to their COs" (11).

Developing-world awareness of the potential of the diasporas does exist. For example, political leaders in India and China have made national calls for their diasporas to assist in S&T capacity-building and have supported these calls with concrete incentives. In India, some of these incentives include provision of dual citizenship; recognition of persons of Indian origin (PIOs) through the creation of a special ministry; an annual celebration and conference for PIOs; and a Research Scientists Scheme, which aims to bring back Indian nationals working overseas to teach in Indian universities. China has committed U.S. \$25 million over a 15-year period to set up a Web site and center to assist permanently and temporarily returned overseas Chinese scholars (5). In 2005, during his keynote address at a Nigerian diaspora conference in which more than 250 scientists from North America participated, the Nigerian president said, "let this conference serve as the beginning of an enduring symbiotic relationship between our peoples in the science and technology sector abroad and those at home that would put in place the neces-

sary structures for the technological transformation of our country" (12). National Diaspora Day is an annual event in Nigeria.

Because industrialized countries benefit from brain drain, their governments should play a key role in establishing institutional mechanisms to help diasporas contribute to development and innovation in their COs (5). If the Group of Eight "G8" countries make engaging scientific diaspora a priority, this would foster innovation in developing countries, which could create long-term health and economic benefits (13).

This recommendation can be achieved by creating Diaspora Business Initiatives and a National Science Corps in industrialized countries. The Diaspora Business Initiatives would provide institutional support and funding to enable partnerships (investment, trade) in the life sciences between business and entrepreneurial communities of industrialized countries and those in COs. The National Science Corps would provide funding for diaspora scientists to travel to S&T institutions in their COs. It would require identification of members of scientific diasporas who are qualified and willing to travel to these institutions in their COs. These National Science Corps could be modeled on the Global Science Corps (GSC), a new initiative that focuses on sending American scientists (not restricted to diasporas) to prequalified institutions in developing countries for 1 to 2 years (14). Initiatives facilitating the return of expatriate professionals for short periods, such as TOKTEN (15), and recent scientific diaspora pilot projects (16) are also models that should be encouraged and evaluated.

Given the increased interest in the scientific diaspora, and the lack of communication and coordination between different initiatives, a stakeholder dialogue between scientific diasporas in industrialized countries, S&T research and biotechnology communities, governments, and nongovernmental organizations in both industrialized and developing countries should be undertaken to determine the best way to harness the human capital of scientific diasporas.

The newly elected government in Canada identified as a priority the creation of an agency to assess the credentials of professionals immigrating to Canada so as to facilitate their entry in their respective fields (17). This could represent an excellent starting point from which to gather information and to begin to build a Diaspora Knowledge Network. The former Canadian Prime Minister said in 2004, "our long-term goal as a country should be to devote no less than 5% of our [research and development] investment to a knowledge-based approach to develop assistance for less fortunate countries" (18). Immigration, innovation, aid, and trade policies are interdependent. Therefore, the new government has a special opportunity to build on its own commitment to recognize foreign credentials by also creating formal mechanisms to enable diaspora scientists in Canada to give back to their COs.

In addition to skills and resources, scientific diasporas have strong emotional connections toward their COs. Although they may have individual connections, a more organized structure would allow them to be more effective. As one participant said, "if the Canadian government created an organization, provided us with a nucleus, made the initial effort, I think there would be so many people who would join." This sentiment applies to many industrialized countries, and should be turned into benefits for the developing world.

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Supporting Online Material

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