



## Scientific Mobility and the African Diaspora

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Over the last 50 years the predominant migration flows - whether in South-North, North-North, North-South and South-South movements - have been of skilled people, the so-called 'brain drain', or flight of human capital. In an increasingly globalizing knowledge economy where human resources matter most, such flows center most on the scientific, technological and engineering workforce. The drain of such highly qualified personnel (HSP) from developing countries has been highlighted because of their potential importance to the achievement of development targets including the UN Millennium Development Goals.

Such evidence that is available about such flows suggests that the skilled migration pattern is highly complex. For, example, there may be an 'internal brain drain' from other sub-Saharan African countries to South Africa, and there may also be an intra-country brain drain from academia to government and industry fuelled by stagnant salaries in many African higher education systems. These may present a more serious if not permanent loss to the academic workforce than the outflow to overseas higher education.

There is lack of data and of common standards for collecting it, but the scale the outflow of HSP from Africa is indicated from many sources, among them:

- The Commission for Africa estimates that around 70% of Ghanaian medical officers trained in the 1990s have left the country;
- The Zimbabwe National Association of Social Workers estimates that 1500 of the country's 3000 trained social workers emigrated to the UK over 10 years;
- It has been estimated that there are more African scientists and engineers working in the USA than in the whole of Africa; furthermore, US data shows that, on average, only 50% of overseas graduates return to their country of origin at the completion of their studies and that the rate of return has been declining despite the increasing volume of immigration to the US. The offsetting opportunities for 'brain gain' are limited in countries where the rate of return is low.

The paper examines skills and migration in industrialised economies, in newly industrialising economies, the migration situation in Africa and initiatives to address the brain drain, before discussing some conceptual issues and future research.



### Countries with industrialised economies

*Canada* appears to be (increasingly) a net gainer in the migration stakes, with a 1999 study suggesting that nearly a third of the growth in some computing specialities in the early nineties was attributable to new immigrants. An Expert Panel on Skills exists to devise policies to attract and highly qualified migrants and retain foreign students, through the offer, for example, of permanent resident status without having to return home at the end of their training. Under the Canadian Research Chairs programme, expatriate and foreign-born appointees constituted 35% of the appointees in the 2002 round, the highest yet. The Government announced further measures to facilitate immigration and integration in its 2006 Budget.

*United Kingdom.* Although it is not facing an immediate skills shortage on the same scale as Canada, the UK is using similar measures to attract foreign academics to the UK, particularly in the private sector, and foreign students to get work permission on completion of their training in the UK (the international market for overseas students in the UK is worth over £3billion). A Highly Skilled Migration Scheme was announced in 2002 and a redesign of the immigration system in 2006 gave extra points to those who sought entry but who had also obtained degrees from UK universities. The UK is also concerned about researcher emigration, especially to the US, and the government and the Wolfson Foundation has launched a Research Merit Award Scheme to allow institutions to top up the salaries of those they wish to retain or recruit from abroad.

*Australia* sets migration number targets and an increasing proportion of growing number (60% of a total of 100-110k migrants targeted in 2001-02) are in the country's Skill Stream. A Skill Stream contingency reserve allows 8,000 additional places for foreigners gaining an Australian qualification in a shortage skill.

*Finland's* in- and out- migration seems to be broadly balanced, with no skill shortage alleviation schemes.

The *United States* has been a net gainer from immigrant and skilled labour from around the world since the 1960s, and it is estimated that it receives 54.3% of the brain drain migration from developing to advanced countries. Overall, 12% of all scientists and engineers in the US are foreign born, including 23% of those with doctoral degrees and 40% of those in engineering and computing. Although only 4% of immigrants with science and engineering higher degrees came from Africa (compared with 57% from Asia and 24% from Europe) the impact on individual African countries can be high: for example, 60% of all Gambians with tertiary education migrate to the US. The US H-1B visa programme provides visas for up to 6 years for individuals to work in occupations that require at least a bachelor's degree.

### Countries with newly industrialising economies

*India.* 40% of the 81,000 work visas issues by the US for skilled professionals between October 1999 and February 2000 were for individuals from India, and over half of these were for computing related occupations. The success of this Indian diaspora created a signal of quality for Indian software, as the UNDP Human Development Report stated in 2001, and the diaspora in turn helped to develop to develop skills and strengthen institutions at home in India. This helped to build the Indian software industry, particularly around Bangalore, and to turn a brain drain into a positive brain gain.

*Republic of Korea.* Emigration of skilled personnel has been a major problem for Korea: 53% of the Korean migrants to the United States in the survey summarized earlier in this paper possessed tertiary qualifications; and only 37% of the Koreans obtaining doctoral degrees in the US returned home. Growth at has changed this pattern, combined with offers of competitive salaries and incentive packages for returnees. There has also been more training at home, and for the last five years Korean students earned more doctoral degrees at home than in the United States. A 'green card' system offering long-term multiple visas has also been introduced to encourage qualified foreign scientists to take up jobs in Korea.

*Malaysia.* Having only 15% of its labour force with tertiary qualifications, Malaysia has pursued two stages of a Returning Scientists Programme between 1995 and 1998 and since 2001 with a range of incentives. The programme now targets Malaysian experts abroad in the fields of IT, S&T, Industry, Finance and Accounting, Arts, Medicine and Health. Medicine and health attracts additional government assistance because of Malaysia's emerging status as a health tourist centre (attracting 75,000 health tourists in 2001).

*Brazil.* In the early decades of the post World War II era the lack of educational infrastructure required governments of developing countries to send their students abroad for advanced training. Since in many cases they did not come back, this was an inefficient way to develop human resources. Governments then

gave greater priority to developing infrastructure for teaching at home in selected areas of S&T, and Brazil became a Latin American base for specialized subjects, notably in pure and applied mathematics through IMPA. Currently Brazil trains most of its masters and doctoral students at home, and most of them return home: 69% of those receiving doctoral degrees in the US in 1999, compared with 10% of the Indians also receiving doctorates in the US in that same year.

#### The situation in Africa

According to UN sources, Africa suffers from a low share of the world's share of inward migration combined with massive and increasing out-migration of skilled personnel: 1,800 a year between 1960-1975, 4,400 a year between 1975-1984, and 20,000 a year since 1990. Alex Nunn (Education Today, 2006:4) notes that this 20,000 is not just a loss of person power but of voices for democracy and development. Migration affects all areas but seems particularly critical in the health and higher education sectors: studies suggest that 60% of doctors trained in Ghana during the 1980s have left the country, whilst a study of the 1995, 1996 and 1997 graduating cohorts from the University of Nigeria suggests that 40% of the graduates are living abroad (50% of the female graduates). In 2003, the United Kingdom alone-approved work permits for 5880 health and medical personnel from South Africa, 2825 from Zimbabwe, 1510 from Nigeria, and 850 from Ghana even though these countries have been included among those proscribed for the UK National Health Service (NHS) recruitment. Although some analysts have suggested that outsourcing of production for developed countries creates new employment opportunities for the developing world African countries rarely have the skilled personnel or the infrastructure needed to take advantage of these opportunities.

*Ghana.* A recent World Bank report on census and population indicated that 47% of Ghana's college educated citizens live abroad, mainly in OECD countries. The paper details the loss of medical and health personnel from Ghana in recent years with 448 doctors leaving the country between 1994 and 2004. Although there is one source of compensation for this loss - the growth in remittances from non-resident Ghanaians which are now at record levels - in the words of Kwesi Andam, "nations are built with brains, not with absentee dollar remittance" (quoted by *Adomako, Appiah Kusi 2006 Ghanaweb Feature, 29 August 2006*). Furthermore, an important aspect of scientific mobility in Ghana is internal, with one study documenting more researchers at the public research institutes opting to join the higher education sector due to worsening conditions of service and poorer remuneration in the institutes.

*Botswana* is a different picture, benefiting from net inflows of the highly skilled, who make up over 90% of doctors, 61% of pharmacists and 64% of radiography staff. Similarly international staff occupy 77% of the professorial posts at the University of Botswana, one of the key research performing units, and 64% of senior lecturers. The country is trying both to expand local training and to speed up the processing of work and residence permits to encourage the favourable inflow to continue, although processing times still may not match those of the industrialized and newly industrializing countries with which it competes.

*Mauritius.* The Island state of Mauritius has in the past been a recipient skilled migrant workers for its manufacturing sector, with India, China and Bangladesh as major source countries. However, the Government of Mauritius is embarking on a new 10-year economic reform programme to address the question of new and young skilled labour entrants into the job market as well as addressing the issue of mismatch of skills in the economy. Despite inward migration gains, there are concerns about emigration of skilled workers, especially in the health sector.

#### Interventions to address brain drain

*The African Union (AU)* adopted policies on the brain drain and on migration management at its Banjul summit in July 2006. These included, on the brain drain:

- promoting policies and reforms to reduce brain drain;
- fostering the mobility and return of those diaspora who can contribute to capacity building;
- strengthening educational systems, improving the working conditions of researchers and teachers, and encouraging the use of local consultants for development projects;

- exploring options to mitigate the effects of large scale loss of African professionals in key areas.

On migration management challenges:

- finding solutions to irregular migratory flows within Africa so as to achieve comprehensive and sustainable development;
- pursuing widespread and concerted approaches covering all migratory routes;
- trying to promote policy coherence at international, regional and national levels, including non-state actors, and promoting better integration of the impact of migration into development policies;
- creating an enabling environment through good governance, etc.

*New Partnership for Africa's Development (NEPAD)*. NEPAD runs a *platforms* programme (2006-10) to:

- bring together researchers, through networks of research groups and institutions;
- improve the infrastructure and facilities for R&D and promote the sharing of such facilities;
- create institutional and policy arrangements that enable African countries to mobilize and share their scarce resources to conduct science and generate technological innovations

in five 'flagship' areas: biotechnology, water and energy, materials science, mathematical sciences, and ICT and space technology.

*Hewlett Packard and UNESCO Joint Initiative*. In November 2006 Hewlett Packard (HP) and the UN Educational, Scientific and Cultural Organisation (UNESCO) launched a new project "Piloting Solutions for Reversing Brain Drain into Brain Gain for Africa", which aims to help to reduce brain drain in Africa by providing grid computing technology to universities in Algeria, Ghana, Nigeria, Senegal and Zimbabwe. The project aims to re-establish links between researchers, who have stayed in their native countries and those that have left, connecting scientists to international colleagues, research networks and funding opportunities. Faculties and students at beneficiary universities would also be able to work on major collaborative research projects with other institutions around the world, with HP providing equipment.

*National initiatives*. *Ghana* held a Homecoming Summit in July 2001 and followed this up in 2005 with an award scheme under the theme "Leveraging Skills and Resources of Non-Resident Ghanaians for National Development". The first *symposium on the Mauritian Diaspora* was held and brought together over 1000 representatives from the Diaspora in July 2006. *South Africa* has evolved several initiatives including the Homecoming Revolution, a non-profit organisation encouraging and assisting South Africans around the world to return home. The Nigerian Diaspora Day (25 July) is part of the government's efforts to mobilise and encourage the participation of Nigerians in the Diaspora in the country's development process. For example, it has been estimated that in the last three years over 30 medical missions have been undertaken to Nigeria, particularly from America by the Nigerian professionals.

Classification of interventions to address the Brain Drain.

The paper draws on a classification by Lowell (2001, Population Research and Policy Review, 20,1-2) to review six 'R's' of policy and programmatic intervention:

*Reparation*: a (never implemented) tax on companies in rich countries who employed skilled immigrants from the developing world, proposed in the 1970s by the Indian economist Jagdish Bhagwati

*Restrictions* on emigration, formerly applied absolutely by repressive regimes such as Eastern Europe under socialism or South Africa under apartheid and discussed now in terms of removal of bureaucratic impediments to inward migration of skilled labour.

*Recruitment*: Recruitment policies and strategies are the main instruments through which governments realise their immigration policies. This has become a major debate in South Africa, with the active recruitment of health professionals, social workers and teachers by some foreign governments having given rise to some heated debate and controversy. The president of the African Union, Alpha Oumar Konare, is quoted as having stated recently that the industrialised nations have taken a "one-sided decision to loot" African countries of their best skilled people.

*Return*: This is the one area where there have been a number of initiatives both at the national and global levels for permanent or temporal return. At the international level, the International Organization for

Migration (IOM) has sought to alleviate, if not reverse, the brain drain problem through its Return and Reintegration of Qualified African Nationals (ROAN) programme. The programme, which was established in 1983, has been used by ten African countries which include Angola, Ethiopia, Ghana, Kenya, Uganda, Zambia and Zimbabwe. Between 1983 and 1995, the programme has facilitated the return of 2 565 professionals to their country of origin, or to where their skills were needed most (ECA, 2000). It is not clear to what extent these returns were permanent or not, as there has not been any evaluation undertaken of this programme. One of the major limitations of the return option as far as many African countries are concerned is that, on the one hand, many of the push factors that precipitated the brain drain in the first place and on the other hand, the equally strong pull factors in the receiving countries still prevail. As Mutume (2003) has put it: "in a globalizing world, where the dominant economic paradigm promotes the free movement of capital, it will become increasingly difficult to restrict the free movement of skilled labour." An observation by Lowell (2004) is that the chances of the return option being successful are increased when there are transnational professional networks in existence, since these play a crucial role in facilitating return. South Korea and Taiwan seem to be one of the few success stories regarding return migration, where the government has played a pivotal role. Parthasarathi (2006) attributes these two countries' success to the already well-resourced and advanced R&D environment - the 'absorptive capacity' of the home country.

*Retention:* Lowell (2003) argues that retention policies and strategies that target the critical sectors of a country's economy stand a better chance of containing emigration, at least in the short term. These policies and strategies generally seek to address the push factors that give rise to the brain drain. Measures that have been introduced include the improvement in the salaries of academics, scientists, technologists and professionals whose skills are in short supply, and increasing investment in research and education infrastructure. Other initiatives that are specific to higher education are regional and continental initiatives that have been established to promote collaborative programmes in capacity development, either through joint academic and research programmes, or the establishment of centres of excellence. Some of the more notable initiatives in Africa are the African Economic Research Consortium (AERC), established in 1988, a public not-for-profit organization that is devoted to the advancement of economic policy research and training, operating as a network of universities and research centres; ICIPE (the African Insect Science for Food and Health), which constitutes another experience of regional cooperation for research training in insect physiology; and the University Science, Humanities, and Engineering Partnerships in Africa (USHEPIA) programme, launched by the University of Cape Town, a successful capacity-building partnership among eight south and east African universities (<http://web.uct.ac.za/misc/iapo/ushepia/bg.htm>).

*Remittances* are not one of Lowell's six R's, because, unlike the other "R's", remittances are not an outcome of a deliberate policy intervention on the part of governments, but are a voluntary initiative from the migrants themselves. Remittances remain a crucial part of the role migration plays in economic development, although there is growing evidence that amounts sent by highly skilled migrants are small and declining. One possible explanation is that many of the lowly skilled migrants tend to leave the rest of their family behind, while the highly skilled emigrants leave with their families.

#### Resourcing/diasporal policies

Meyer and Brown's classification of diasporal networks in 1999 ([www.unesco.org/most/meyer.htm](http://www.unesco.org/most/meyer.htm)) includes student scholarly networks, local associations of skilled expatriates, developing intellectual/scientific diaspora networks which contribute to the development of their own country, intellectual/scientific networks, plus a specific programme, The Transfer of Knowledge Through Expatriate Nationals (TOKTEN) programme. This is a United Nations Development Programme (UNDP) initiative that identifies highly skilled expatriates and assists them to return to their home country for short visits to engage in development programmes or teaching at local universities. The Meyer/Brown paper identifies 41 expatriate knowledge networks established in some 30 countries since the early 1980s.

Two South African schemes are discussed in detail, South African Network of Skills Abroad (SANSA) which was established to link highly skilled South African professionals living abroad with their South African counterparts, and the South African Research Chairs Initiative (SARCHI), which is funded by the Department

of Science and Technology. There is agreed to be a lack of research on the effectiveness of diasporal networks but the research that is reported in the papers suggests scepticism about their permanence and effectiveness.

#### Conceptual issues

Much conceptual literature suggests that the 'brain drain' concept no longer does justice to the complexity of the migration of skilled labour and 'brain circulation' - derived from the Mertonian sociology of science - is more appropriate. The brain drain paradigm, according to these authors, is premised on human capital theory, which treats labour or human capital as a fixed asset that is manipulable. As a consequence, the policies that have been devised to address it assume that governments can intervene to reverse the brain drain itself, if not its effects, by determining or shaping their national labour markets. In contrast, the starting point of the brain circulation framework is that the international mobility of human capital is governed by (global) market considerations, over which individual governments have no control. Further, the international mobility of highly skilled personnel (HSP) is seen as a contributor to, and also a consequence of, globalisation and, as such, should be seen as one of the indicators of the interdependence and convergence of the world economy. Therefore, instead of devising policies and strategies that seek block or hinder the mobility of HSP, X. Cao's (1996, *Compare*, 26,3) advice to developing countries is that they ought to manage it by creating a favourable domestic (political and economic) climate that will make it possible not only for their skilled émigrés to return, but for these countries to attract other (developed) countries' HSP as well - hence his notion of a brain 'exchange'.

The problem, however, is that not only does this advice sound very much like that which used to be dispensed by the IMF to struggling economies in the South *via* its Structural Adjustment Programmes: if only the developing countries could embrace the free market principle of liberalising their economies by lowering or breaking down their tariff barriers and introducing flexible labour markets, all will be fine. And, as we know, this remedy didn't work for the developing countries. As Meyer *et al* (2001) have noted, the international mobility of HSP is not simply a consequence of a neutral and/or market co-ordinated operation of the global supply and demand of labour. These knowledge flows are also, and perhaps pre-eminently, influenced by the highly selective nature of the immigration policies of most OECD countries; and it is only these OECD countries (plus Taiwan, India and China) that have to some extent reversed the unidirectional outflow of skilled workers and thus showed evidence of 'brain circulation'.

#### Issues for further research

Since one of the key issues or concerns regarding these networks is their sustainability, it is surprising that there is not much discussion within the literature with regard to how these diaspora knowledge networks can - or should - be institutionalised, and what the benefits or disadvantages of such institutionalisation would be. One is thinking of the absence in the literature of the role that (international) bilateral partnerships between universities could be used as a vehicle for fostering linkages between diasporal networks and their home countries, rather than leaving this to individual volition and effort. Other issues that have to be further researched and investigated are the following:

- Are 'Southern' countries whose universities have established linkages through knowledge-producing networks with their counterparts in the North less likely to experience brain drain (and instead more brain circulation) than those countries without such networks, other things - such as political and economic stability - being equal?
- To what extent are the new modes of knowledge production fuelling the brain drain or the outflow of highly-skilled knowledge workers from developing countries?
- To what extent do bilateral agreements and partnerships between countries provide an opportunity for diasporal networks to get involved in long-term initiatives, especially if these are driven by institutionalised and well-funded projects in which universities from the participating countries participate?
- If South Africa can be regarded as a semi-peripheral country - in that, in terms of the world systems approach, it is a regional power that is attracting skilled personnel from other African countries on the one hand, whilst also experiencing its own skills-flight to other Northern countries - what strategies should it be looking at in promoting brain circulation?