
Highly skilled migration from developing countries:

Qualitative overview of South African and Colombian scientific diasporas in Switzerland

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1. Introduction and Conceptual Framework

Several key themes emerge when migration of the highly skilled is being discussed. In the past, dialogue centered around concepts of assimilation and integration, and migration meant a loss of capital and resources for countries of origin (“brain drain”). New evidence and literature document the increasingly fluid movement of resources between countries of origin and destination. Consequently, concepts such as highly skilled migrants, diasporas, transnationalism, brain gain and brain gain mechanisms-- scientific diaspora networks, research and experimental development and North-South research partnerships-- have taken the foreground in debates on migration.

Key Terms:

- **Highly Skilled Migrants:** *According to the OECD Canberra Manual (1995), these are people who fulfill either of the following conditions: completion of an undergraduate education in a scientific or technological field; and/or employment in a science or technology-related occupation for which it is normally necessary to possess an undergraduate degree; tertiary education students and professionals or intellectuals in high-level occupation.*
- **Diasporas:** *This term evokes the image of a transnational population that has emigrated from its country of origin to another state, but retains links and connections with its home country.*
- **Transnationalism:** *Coined in the 1990s, this term encompasses the back-and-forth movement of migrants who simultaneously exist in two or more societies (Portes et. al, 2005).*
- **Brain gain/Brain gain mechanisms:** *Reciprocally related to brain drain, this trend emphasizes the flow of resources (human, social, financial) from migrants abroad back to their countries of origin. This notion represents the school of thought that the physical loss of migrants can be partly countered by maintaining exchanges and linkages with one's country of origin..*

Highly skilled migrants are defined in the terms of the OECD Canberra Manual (1995), which states that the highly skilled are people who fulfill either of the following conditions: completion of an undergraduate education in a scientific or technological field; and/or employment in a science or technology-related occupation for which it is normally necessary to possess an undergraduate degree; tertiary education students and professionals or intellectuals in high-level occupations. These and other skilled migrants living abroad comprise the diaspora. The term diaspora was initially used in reference to the persecution of the Jews and the African slave trade (Newland and Patrick, 2004), but has come to mean a population that has emigrated from its country of origin to another state, but which retains links and connections with its home country; diaspora members are conscious of their multiple presence since they are multilocalized (Vertovec and Cohen, 1999). Hein de Haas elaborates further that diaspora groups establish flows and exchanges of resources and people between countries of origin, countries of destination and among destination countries (de Haas, 2006).

Members of the diaspora illustrate the notion of transnationalism, which entails the back-and-forth movement of migrants who simultaneously exist in two or more societies (Portes et. al, 2005).

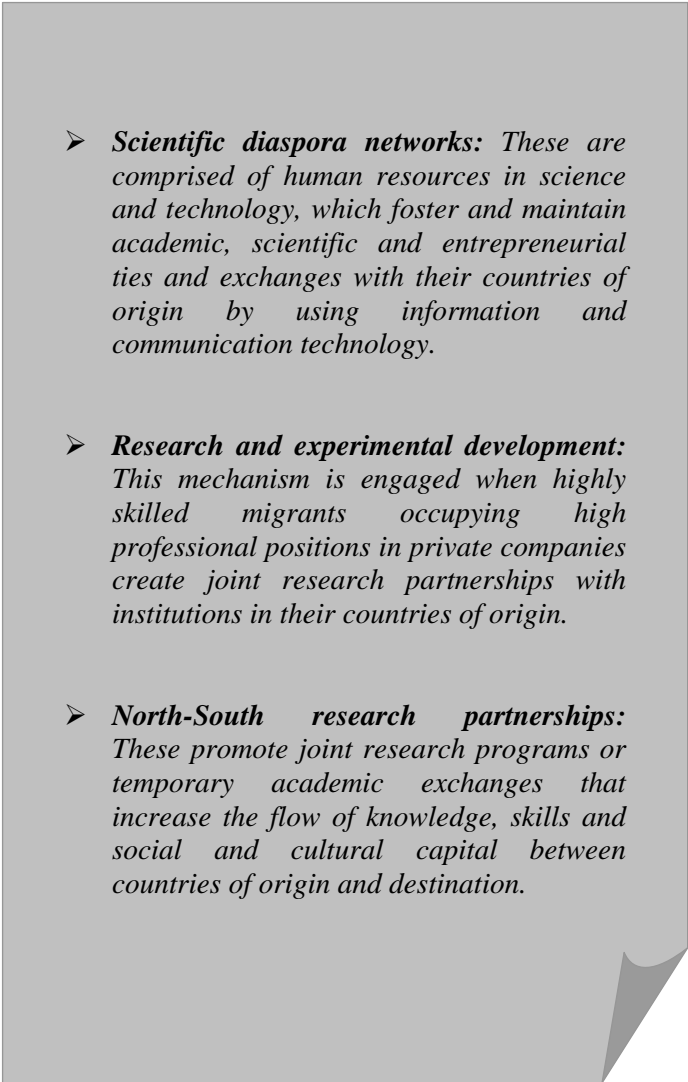
While the physical departure of emigrants used to mean a large loss for countries of origin, new systems have been established to increase flows of resources (human, social, financial) from migrants abroad back to their countries of origin.

Brain gain mechanisms, such as scientific diaspora networks, investment in research and experimental development, and North-South research partnerships can partly help to counter the skills gaps left by emigration. Through the creation of networks, exchange programs and cooperation in scientific and academic fields, migrants can contribute to the advancement of human capital in their home countries (Tejada and Bolay, 2005).

Scientific diaspora networks are comprised of human resources in science and technology, which foster and maintain academic, scientific and entrepreneurial ties with their countries of origin. By using information and communication technology, these migrants have linked up resources in the countries of destination with scientists and institutions in the countries of origin. These networks have been identified as a key channel through which emigration countries can benefit from national talent regardless of its location (Meyer, Kaplan and Charum, 2001).

Another key channel is investment in research and experimental development (R&D). This mechanism arises when a highly skilled migrant occupying a high professional position in a private company creates joint R&D partnerships with institutions in his country of origin. This mechanism has allowed for the creation of health facilities, educational institutions, foundations that support social projects and other infrastructural developments (Khadria, 2003).

Finally, North-South research partnerships have been highlighted as significant tools for enhancing research capacity and helping to solve the major problems faced by developing countries (KFPE, 2001). Such partnerships promote joint research programs or temporary academic exchanges that increase the flow of knowledge, skills and social and cultural capital between countries of origin and destination. With a firm understanding of these key terms, one can fully interpret the responses of the highly skilled migrants and elaborate on the channels through which they can impact the development of their countries of origin.



- ***Scientific diaspora networks:** These are comprised of human resources in science and technology, which foster and maintain academic, scientific and entrepreneurial ties and exchanges with their countries of origin by using information and communication technology.*
- ***Research and experimental development:** This mechanism is engaged when highly skilled migrants occupying high professional positions in private companies create joint research partnerships with institutions in their countries of origin.*
- ***North-South research partnerships:** These promote joint research programs or temporary academic exchanges that increase the flow of knowledge, skills and social and cultural capital between countries of origin and destination.*

2. Highly Skilled Migrants in the Swiss Labour Market

With a special focus on migrants from developing countries

Overview

After the Second World War, many industrialized countries – including Switzerland – resorted to the procyclical exploitation of foreign workers, who were essentially low-skilled. The practice of such an immigration policy was initially used to satisfy the excessive internal labour demand during an economic boom, thereby sustaining growth (Salt *et al.*, 2004).

The determinants of economic growth have changed progressively since the oil crisis of the 1970s. According to the *new growth theory*, human capital¹ is one of the necessary bases for economic growth (Lucas, 1988). Indeed, gross domestic expenditure on R&D increased significantly during the 1990s and the field of science and technology (referred to as S&T hereinafter)² grew considerably in the majority of developed countries including Switzerland (Pastor, 2000). Moreover, the relative labour demand for highly skilled workers has increased at the expense of the less skilled. This is more commonly referred to as *skill bias technological change*. At the same time, we have observed an increase in the relative labour supply of qualified workers. Accordingly, the nature of migration flows, which was mainly characterized by a low-skilled labour force, has evolved in favour of highly skilled labour (Pecoraro, 2005).

There are at least two ways to measure a worker's skill level. The traditional method refers to educational attainment or to be more precise, employed or unemployed workers with a tertiary-level education are defined as being high-skilled. The second method does not rely exclusively on the educational background, but it also takes into account the type of occupation. According to the "Canberra Manual" (1995), the highly skilled labour force either has successfully completed education at the tertiary level or else it is employed in a S&T occupation.³

Table 1 shows the proportion of the migrant labour force⁴ that had a tertiary-level education in 1990 and 2000. For nearly all migrant groups (excepted the Latin America community taken as a whole), this share improved during the 1990s. For the total migrant population, it increased by almost two thirds (21.1% in 2000 as opposed to 12.8% ten years ago). In 1990, most labour migrants from North America and Oceania had completed a tertiary-level education, whereas only a minority of those from other origins had achieved such a qualification (the proportions ranged from 10% to 30%). In 2000, however, Chinese and Indian migrants showed higher levels of third-level educated workers than ten years before. Moreover, these figures rise above 50% (also the case with South African migrants) while they remain below 30% in reports by regions of origin.

¹ Human capital indicates any form of investment made by an individual to improve his knowledge, culture, health or even his social network.

² The concept of « science and technology » is related to the activities for which a high-skill level is normally required.

³ S&T occupations include a rather large group of jobs (corporate managers, specialists in their field of competences) and do not exclusively refer to scientific qualifications.

⁴ In all the tables of this report, migrant population refers to all foreign-born persons, irrespective of the date of their entry into Switzerland.

Table 1: Distribution of migrant labour force in terms of highest level of education attained

Geographical origin	1990			2000		
	Education		Total	Education		Total
	Below tertiary level	Tertiary level		Below tertiary level	Tertiary level	
Europe	88.5	11.5	655'358	80.3	19.7	649'414
<i>EU-15/EFTA-3</i>				75.3	24.7	413'665
<i>Other European Countries</i>				89.9	10.2	235'749
Africa	76.9	23.1	15'168	75.4	24.6	24'013
<i>North Africa</i>				70.7	29.3	9'323
<i>Sub-Saharan Africa</i>				78.5	21.5	14'690
<i>South Africa</i>				44.1	55.9	629
North America	32.3	67.7	7'088	20.4	79.6	9'607
Latin America	72.8	27.2	8'879	74.0	26.0	17'386
<i>Colombia</i>				63.9	36.1	1'508
Asia	82.8	17.2	36'932	75.8	24.2	43'304
<i>China</i>	72.8	27.2	1'687	46.8	53.2	2'527
<i>India</i>	74.6	25.4	3'520	41.0	59.0	2'923
Oceania/Other Countries	45.3	54.7	1'296	36.5	63.5	1'797
Total	87.2	12.8	724'721	78.9	21.1	745'521

Source: Swiss population censuses data 1990-2000 (SFSO). As a percentage of the migrant labour force. Men aged 15-64; women aged 15-61. The number of persons is obtained by extrapolation. The migrant population represents all foreign-born persons irrespective of the date of their entry into Switzerland.

Table 2: Distribution of the migrant labour force in Switzerland, by origin

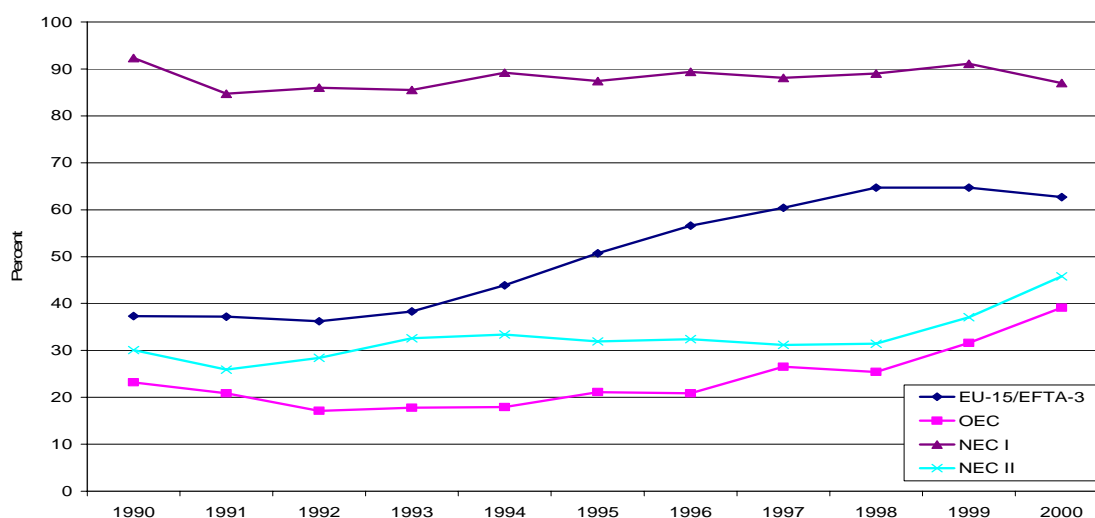
Geographical origin	1990			2000		
	Highly skilled	Low-skilled	Total	Highly skilled	Low-skilled	Total
Europe	20.8	79.2	655'358	35.3	64.7	649'414
<i>EU-15/EFTA-3</i>				41.6	58.4	413'665
<i>Other European Countries</i>				20.2	79.8	235'749
Africa	32.2	67.8	15'168	33.7	66.3	24'013
<i>North Africa</i>				38.9	61.1	9'323
<i>Sub-Saharan Africa</i>				30.1	69.9	14'690
<i>South Africa</i>				73.1	26.9	629
North America	82.1	17.9	7'088	90.5	9.5	9'607
Latin America	42.6	57.4	8'879	38.3	61.7	17'386
<i>Colombia</i>				45.8	54.2	1'508
Asia	25.6	74.4	36'932	35.4	64.6	43'304
<i>China</i>	36.2	63.8	1'687	61.7	38.3	2'527
<i>India</i>	42.6	57.4	3'520	79.5	20.5	2'923
Oceania/Other Countries	69.1	30.9	1'296	78.3	21.7	1'797
Total	22.2	77.8	724'721	36.4	63.6	745'521

Source: Swiss population censuses data 1990-2000 (SFSO). As a percentage of the migrant labour force. Men aged 15-64; women aged 15-61. Human resources defined according to the Canberra Manuel (1995). The number of persons is obtained by extrapolation. The migrant population represents all foreign-born persons irrespective of the date of their entry into Switzerland.

Using the definitions included in the “Canberra Manual” (1995), Table 2 proposes similar trends. Since 1990, migrants to Switzerland have been more and more highly skilled, whatever the origins of the population (apart from Latin America in aggregate terms). In 2000, highly skilled migrants represented 36.4% of the migrant labour force compared to 22.2% ten years previously. This proportion reaches 38.9%, 30.1%, 38.3% and 35.4% among migrants from North Africa, Sub-Saharan Africa, Latin America and Asia respectively. Again, migrants from South Africa, China and India are mainly high-skilled (73.1%, 61.7% and 79.5% respectively).

Figure 1 presents the share of high-skilled labour by year of entry for the primary migrants⁵ living in Switzerland in 2000, according to four main regions of origin. We can clearly observe an increase in the proportion of highly skilled labour among the cohorts who arrived at the beginning of the 1990s, except in the case of those coming from non-European developed countries (i.e. NEC I), with a large majority of cohorts from these countries (proportions ranging between 85% and 90%) remaining highly skilled. However, the “speed” (= slope) of progression differs according to national origin. While the maximum share is reached among EU/EFTA cohorts arriving in 1998 and 1999 (two thirds in each case), the share growth rate increased strongly among cohorts from non-EU/EFTA countries (North America, Japan, Taiwan, South Korea, Singapore, Israel and the countries of Oceania excluded) arriving during the same period (steeper slopes). When only non-European developing countries (i.e. NEC II) are considered, the share of highly skilled labour remains stable (around 30%) among cohorts arriving between 1990 and 1998, then increases for cohorts who arrived after 1999 and reaches the maximum value (about 45%) among cohorts arriving in 2000.

Figure 1: Share of highly skilled primary migrants by regions of origin, skill level and year of entry (since 1990)



Source: Swiss population census data 2000 (SFSO), Central register of foreigners (ZAR) and Automated Personal Registration System (AUPER). As a percentage of the primary migrant labour force living in Switzerland in 2000. Men aged 15-64; women aged 15-61. Human resources defined according to the Canberra Manual (1995). OEC = Other European countries; NEC I = Non-European countries (excluding Africa, Latin America and Asia without Japan, Taiwan, South Korea, Singapore and Israel); NEC II = Non-European countries (excluding Japan, Taiwan, South Korea, Singapore, Israel, North America and the countries of Oceania).

⁵ The primary migrants are the foreign-born persons who were at least 15 years old at the time of their entry into Switzerland.

3. Swiss Migration Policies; Swiss Development Cooperation Policies; and Swiss Scientific Collaboration Policies towards Colombia, South Africa and India

3.1 Swiss Migration Policies and Different Types of Residence Permits

Switzerland has long been a country with a high immigration rate. Some 22.4 per cent of the total Swiss population of 7.4 million inhabitants are foreign born while 20.5 per cent are people of foreign nationality (Kaya, 2005). Switzerland was formerly a prime destination for labor-seeking migrants from France, Germany and Italy. Current waves of immigration have been comprised of an increased number of Eastern European, Yugoslavian, Middle Eastern, Asian and African dissidents, refugees and asylum seekers. The challenge to strike a balance between the country's foreign labor needs and the demographic stability of its foreign population lies at the epicenter of Swiss immigration policy.

Residence permits available in Switzerland:

- **Short-time residence permits (L Permit):**
Valid for a maximum of 18 months for further vocational educational or private activities.
- **Year-round residence permits (B Permit):** Renewable, one-year permits. Given to qualified specialists and based on a federal quota system. Permits with a maximum four-year span can also be granted.
- **Permanent residence permits (C permit):**
Granted after a 10-year uninterrupted stay in Switzerland. Those in possession of this permit have almost equal rights and opportunities as nationals.
- **Border commuter permit (G permit):**
Permit granted to border commuters who are legally residing in a neighboring country. Commuters must return at least weekly to their country of residence.

The fear of foreign overpopulation or *Ueberfremdung* (Kaya, 2005) is a major concern. Preference is given to highly skilled migrants who can positively contribute to the needs of a labor market that is linked to a changing global economy. Unskilled and low-skilled labor are less desirable as they often incur social costs upon their host country during economic recessions, when the possibility of unemployment increases. It is interesting to note that the revised Foreign Nationals Act also supports the immigration of "independent persons," for whom it is in Switzerland's best public and economic interest to admit. This is a new category, not specified as highly-skilled or low-skilled.

Bilateral agreements give European Union Member States the right to free movement between the EU and Switzerland. Preference is given to movement of EU nationals rather than those from non-EU states, as the former have a greater chance of social and professional integration. These desires have meant an increasingly restrictive migration policy for Switzerland, particularly for non-EU nationals. The immigration debate has increasingly centered around the notion of *controlled migration* which links immigration, security and crime in Switzerland (Kaya, 2005). With regard to asylum seekers, greater efforts are being made to curb

abuse and false claims. Undocumented immigrants are dealt with on a case-by-case and cantonal basis. While the canton of Geneva entertained proposals to deal with its 5000 undocumented migrants collectively, the canton of Zurich exclusively upholds an expulsion policy for such migrants. Restrictive measures have also been taken to limit family reunification. The newly drafted Foreign Nationals Act details that the children of migrants who have permanent residency and who are aged 14 years or under can obtain a residence permit, while those up to 18 years of age will receive a one-year residence permit with the chance of renewal. For third-country nationals, the right to family reunification is stipulated in the Law on the Entry and Stay of Foreigners and the Decree on the Limitation of the Number of Aliens. These state that reunification is based on the residence status of the person making the request (Efionayi-Mader et al, 2003).

Despite its brevity, this insight into the main migration policies and trends facing Switzerland is a necessary one if we are to gain a deeper understanding of the causes and characteristics of highly skilled migration in Switzerland and the contributions that migrants make to the development of their countries of origin.

3.2 Swiss Development Cooperation Policies and Swiss Scientific Collaboration Policies towards South Africa, India and Colombia

Swiss Development Cooperation Policies

The Swiss Agency for Development and Cooperation (SDC) is responsible for international development cooperation activities in Switzerland, which are an integral part of Swiss foreign policy. In order to allow it to respond to current global challenges, the SDC carries out its poverty-fighting activities in three main areas: Bilateral and multilateral development cooperation (with 17 priority countries and 8 special programmes); Humanitarian aid (with 7 focus areas); and Cooperation with Eastern-Europe (with 7 priority countries and 2 priority regions, and 3 special programmes). SDC focuses its work on five main themes: Crisis prevention and resolution; Good governance; Increase of social justice; Employment and income generation; Sustainable use of natural resources. Furthermore, SDC concentrates its activities on selected geographical priorities which are defined according to need, potential, SDC's relative advantages and Switzerland's political interest. Humanitarian aid is exempted from these conditions. The SDC is currently active in South Africa, India and Colombia under different mandates and forms of cooperation as well as different levels of intensity, and it has an office in each of these countries.

South Africa

Switzerland and the Republic of South Africa have carried out development cooperation activities for more than 20 years. The objective of the various collaboration mechanisms implemented by the SDC has been to reduce poverty and economic inequality and to help with the democratic transformation of society. With regard to this last point, the first phase of a SDC *Special Programme*⁶ was the Swiss government's response to South Africa's first multi-racial elections in 1994, and its purpose was to contribute to the transition to democracy. This program was followed by a second phase represented by the Special Programme South Africa (SPSA) 2000-2004 which covered three main areas: governance, education and land affairs. The *Joint Programme Review*, completed at the end of 2003, served as a basis for reshaping future orientations (De Coning, Graf and Hargovan, 2003).

Today, cooperation with South Africa has been marked by the end of the SPSA 2000-2004 and the phasing in of the Regional Programme Southern Africa 2005-2010 (RPSA), which, according to the SDC, has an annual budget of less than CHF 10 million and which has an important South African component (<http://www.deza.ch>). The RPSA represents a shift towards supporting regional priorities aimed at reaching regional cooperation, and it is based on favourable factors such as the increasing relevance of the Southern Africa region as a framework for policy development and mutual learning, South Africa's role as a regional leader as well as the fact that South Africa has become Switzerland's main partner in Sub-Saharan Africa.

The bilateral South Africa component of the RPSA currently includes the following four ongoing projects: The Small Claims Courts Project; The Media in Education and Training Project; The "Masibambane II" – Water Sector Services Support Project; and The Swiss-South African Cooperation

⁶ A *Special Programme* means that the programme supporting the partner country (in this case South Africa) is limited in time and in a critical phase of transition.

Initiative (SSACI). The SSACI represents a good example of SDC cooperation with South Africa involving the private sector. The SSACI was launched by SDC in 2001 in conjunction with ten Swiss companies operating in South Africa and it constitutes a social investment initiative and is designed to contribute to the improvement of the educational and vocational skills of young disadvantaged South Africans in order to enable them to obtain employment, thereby promoting social and economic development.

India

SDC has been active in development cooperation activities in India since 1963, and since then, SDC's partnership with India's development agenda has covered a diverse range of engagements covering different fields, the main objective being to contribute to the reduction of poverty by fighting against discrimination. The SDC's involvement in programmatic focuses related to the retention and sustainable use of water, rural finance and livelihoods, empowerment and employment as well as rural energy and housing serves as a vehicle to help achieve this purpose.

Although livestock and vocational training remained the SDC's major areas of intervention in India until the 1980's, the SDC began its involvement in rural agricultural finance in 1979 and in 1984 it started its activities related to sustainable land use. In the 1990's the Indian government launched its first round of reforms towards liberalization, a major change that had been contemplated in the SDC's 1996-2003 country programme. Today, India is one of the 17 priority countries for SDC bilateral development cooperation and the SDC believes that poverty has been reduced in semi-arid rural areas of this country and that India has embarked on a new phase of development and progress. For this reason, SDC policy in India is currently being redefined in the knowledge that it will be reduced over the next few years.

Colombia

Colombia is not a priority country for the SDC's development cooperation policies, and today Colombia is not among the 7 focus areas for SDC humanitarian aid. Nevertheless, SDC humanitarian aid is present in Colombia and since 2001 it has been based on Swiss foreign policy objectives as a mandate of the Swiss Parliament as well as the Swiss Federal Council. With an annual budget of approximately CHF 4 million (<http://www.cosude.org>) and with the overall objective of easing the suffering of internally displaced persons (IDP) and other victims of the armed conflict, the SDC's Human Aid Department works in partnership with international organisations such as ICRC, the UNHCR, the World Food Programme and diverse NGOs within four fields of action: emergency assistance, rehabilitation, conflict prevention and advocacy.

SDC humanitarian aid in Colombia promotes projects in rural areas and small towns and is aimed at stopping internal migration and the related increase in poverty within urban areas. Within a broader framework, it is aimed at contributing to the improvement of peace conditions, life protection, and the alleviation of suffering through preventive measures, as well as the allocation of resources to enhance development for the majority of the people.

Swiss Scientific Collaboration Policies

The Swiss State Secretariat for Education and Research (SER) is responsible for defining the instruments of scientific cooperation as well as the principles of cooperation, direction and finance. The main instruments for establishing and implementing scientific exchanges between Switzerland and other countries or regions are: networks of scientific and technological consultants; Swiss Leading Houses for scientific and technological exchange; shared laboratories, bilateral agreements and related action programmes; scientific roundtables and their related "Focal Points"; scholarships and cooperation between national funds. From an SER point of view, there are three levels of collaboration that guide and promote international scientific and technological cooperation: 1) scientist-scientist collaboration; 2) university-university collaboration; and 3) government-government collaboration.

SER's bilateral cooperation strategy with priority countries is part of the message aimed at encouraging education, research and innovation during the years 2008-2011 that the Swiss Federal Council transmitted to the Parliament at the beginning of 2007. The document "Education, research and innovation 2008-2011" (SER, 2007) outlines the guidelines and measures of Swiss policy in these areas for the near future, and the proposed funding for worldwide bilateral scientific cooperation amounted to CHF 43 million, with special focus on China, India, Japan, Russia, South Africa and South Korea⁷. There is a selection of countries where Swiss scientific cooperation with developing countries can be concentrated at the same level as Swiss development cooperation, but on the basis of scientific criteria rather than poverty. For most of the countries, the choice is the result of scientific opportunities and technological and economic prospects (cases in point being the emblematic examples of China, India, Brazil or Chile).

South Africa

Swiss-South African collaboration in the field of science and technology currently has two main mechanisms: 1) that established between the SER and the South African Department of Science and Technology; and 2) that established between the Swiss National Science Foundation (SNSF) and the South African National Research Foundation.

The Memorandum of Understanding on Scientific and Technological Cooperation signed between the SER and the South African Department of Science and Technology in 2005, saw the commencement of work on the shaping of an official bilateral Science and Technology Agreement. The protocol on Scientific and Technological Cooperation between the two countries recognizes the importance of science and technology for the social and economic development of both countries. Cooperation in these fields is strengthened and the Agreement will be an all-embracing instrument that ensures proper support on an equal and beneficial basis for South African and Swiss researchers from universities, science councils and institutions.

Two main objectives were discussed and agreed upon during the visit by the Swiss State Secretary for Education and Research to South Africa in March 2007, which was hosted by the South African Minister for Science and Technology. These were: 1) The launch of negotiations for a Science and Technology framework agreement; 2) Agreement on a four-year South African-Swiss strategy for 2008-2011. On the South African side, the Council for Scientific and Industrial Research (CSIR) has been designated as the Leading House for bilateral cooperation. On the Swiss side, the University of Basle and the Swiss Tropical Institute in Basle have been designated as the Leading House and the Associated Leading House respectively and cooperation efforts will be done particularly in the fields of public health (biomedicine), biotechnologies, nanotechnologies and social and human sciences. The planning is for the Swiss-South African strategy 2008-2011 to finalise in autumn 2007 and for the Science and Technology bilateral agreement to be signed at the end of 2007.⁸

On the other hand, the SNSF and the South African National Research Foundation signed a Memorandum of Understanding for Cooperation in S&T in 2002, which envisaged bilateral scientific seminars for cooperation between scientists in each country in specific areas of interest. A joint call was carried out in 2005 and 4 proposals out of 21 were accepted for funding (in the following areas: humanities and social sciences; mathematics, natural and engineering sciences; biology; and medicine). A further call is envisaged to take place in autumn 2007.

⁷ The overall federal budget proposed to support the European and worldwide cooperation of Swiss players and institutions in education, research and innovation between 2008 and 2011 amounts to a total of CHF 755 million, representing a budget increase of CHF 170 million compared to the previous period (SER, 2007).

⁸ It is worth mentioning that one representative of the South African scientific diaspora in Switzerland and a respondent to our survey was appointed by the Swiss Ministry of Education and Research in 2005 to develop a scientific cooperation strategy for Switzerland and South Africa.

India

The 2003 Agreement between the Swiss Federal Council and the Government of the Republic of India on Cooperation in the fields of Science and Technology established the framework for bilateral collaboration in these areas over the past few years. Bilateral collaboration in Science and Technology has made use of several instruments.

At present, Switzerland and India are negotiating the implementation of a new four year Indo-Swiss science and technology cooperation strategy 2008-2011⁹, for which the EPFL and the University of Lausanne have been designated as the Swiss Leading House and the Associated Leading House respectively. The main purpose of the new Swiss-Indian bilateral programme is to strengthen academic and research relationships between Switzerland and India, mainly but not exclusively in the following fields of cooperation: information and communication technologies; material sciences and nanotechnology; and life sciences (biological and medical sciences). According to planning, the Indo-Swiss science and technology cooperation strategy 2008-2011 will be finalised in autumn 2007. Projects will presumably begin in January 2008 and run through to December 2011.

Colombia

There is no institutional framework for scientific collaboration between Switzerland and Colombia. Colombia's unstable situation, caused by the armed conflict and the lack of social cohesion, prevents the country from projecting itself as a candidate to become a priority country for the establishment of a scientific collaboration policy at government-government level. However, there have been some interesting specific collaborations¹⁰ on a systematic basis at a university-university and scientist-scientist level. Most of these have been promoted by members of the Colombian scientific diaspora in Switzerland. An example of such collaboration is the most significant project at a scientific level involving the two countries up to now and which was signed by the SER and COLCIENCIAS in 2005, the COCH Project. This project, "Precision agriculture and the construction of field-crop models for tropical fruit societies", was led by two Colombian lecturers at the REDS Institute of the Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud (HEIG-VD). The project is currently being carried out in partnership with Biotec -Colombian research consortium on agrobiotechnology- and CIAT - an international institute that performs advanced agricultural research in several developing countries. The project is being developed by three Colombian students who came to Switzerland do their doctorates. Even though it involves a specific project supported by the SER's bilateral scientific policy of benefiting proposals that are of an scientific excellence and whose content is interesting for Switzerland, this is undoubtedly the first project of the call for long term and large scale Colombian-Swiss scientific policy cooperation.

⁹ The purpose of the trip of the Swiss State Secretary for Education and Research to India, from April 27th to May 2nd 2007 is to hold discussions on the implementation of the bilateral cooperation strategy for science and technology.

¹⁰ The Colombia Embassy is currently preparing an inventory of the projects that have been carried out in Colombia.

4. Qualitative Analysis of Scientific Diasporas of South Africa and Colombia

4.1 Introduction and Methodology

This quantitative analysis is part of the empirical phase of the project, which is based in field work in country of destination of highly skilled migrants. The three selected countries for this qualitative analysis are: Colombia, India and South-Africa. The cases of highly skilled Colombians and Indians are good examples, due to the dynamism of these migrants' scientific and professional diasporas around the world, as well as for their significant brain gain experiences. According to the Swiss Population Census 2000, 45,8% of Colombians living in Switzerland are highly skilled, placing this country after Mexico (69%), Argentina (61,2%) and Peru (46,8%) for Latin American populations in Switzerland. The gender dimension is also important; 56,6% of the highly skilled Colombians in Switzerland are women, a trend that appears to be on the upswing: 63,3% of Colombian highly skilled immigrants arriving in Switzerland after 1995 were women. India and South Africa are also relevant examples. As previously mentioned, Switzerland already has important scientific cooperation agreements in place with India, and the percentage of highly skilled Indians in the Swiss Indian immigrant population is very high (79,5%) - higher even than skilled Chinese immigrants (61.7%). This is also the case for South Africa; 73,1% of South Africans in Switzerland are highly skilled. Additionally South Africa has a well-established scientific dialogue with Switzerland and both countries have carried out development cooperation activities for more than two decades.

The strategy for selecting appropriate persons for the survey was based on **networking** schemes (interpersonal relations) and Web search. The selection of the respondents was made gradually in the course of the field work through the Chain referral sampling *or* snowball sampling. In the course of the field research we collected and also validated contacts information of potential respondents through the snowball effect scheme. The strategy consisted in asking to the respondents for further names and contact information. Several key institutions were consulted like: embassies, universities, research institutes, private companies, diaspora networks and associations, alumni offices from ETHZ and EPFL, North-South research programme managers, NGO's, international organisations, etc. Further sources used were websites, telephone directories and magazines or newspapers.

For the **sampling strategy**, after considering that using the principle of quota would lead to some imbalances, we decided to fix the number of respondents to 20 for each country and maybe add more Indian highly skilled workers and Colombia in the process of the qualitative survey in order to reflect their representativeness.

The field work was based on **qualitative in-depth interviews**. The sixty one (60) interviews conducted (24 Colombian, 18 Indian and 18 South African) allowed us to gain more understanding of the perceptions, strategies and practices of highly skilled migrants, with regard to the following issues:

- Determinants and causes of the international migration of highly skilled workers and migrants' living conditions in Switzerland, migrant trajectories and migrants' living conditions.
- Brain gain; mechanisms, strategies, opportunities, constraints and impacts on the development of country of origin and country of destiny, links between country of origin and country of residence, installation, return, transnationalism and circulation.
- Scientific Diasporas and development of the country of origin: Which scientific and development policies should be implemented for this purpose?

Attention was paid to scientific objectivity through precise transcription of data obtained at the interviews. Additionally, the documents "*List of respondents*" and "*Socio-demographic characteristics of respondents*" were prepared and dully completed after each interview to help controlling the sample. These documents were placed in the database "Scientific Diasporas Network", a wiki created through EPFL exchange platform. All transcribed interviews were also placed there, making their content open to all researchers. This wiki has helped us to facilitate work exchange and coordination, specially considering that the three field work researchers are based in different institutions.

A **data analysis** template was designed including different possible choices for the respondent's answers where the different responses from the transcribed interviews were placed. This template has helped us to classify and order the answers and has facilitated the analysis.

The qualitative interviews results will help us designing the questionnaire for the next field work phase that will be applied to some 150 highly skilled persons. The research will be complemented with relevant information on familiar background/environment and intergenerational attitudes by using biographical research methodologies. An interview guidelines for the **biographic interviews** has already been designed.

This paper includes the most relevant results from the in-depth interviews for the cases of highly skilled South African and Colombian in Switzerland. An overview with the results of the first approach to highly skilled Indian including the analysis of the interviews carried out with members of the Indian scientific diaspora will be presented at the workshop.

4. 2 South Africa – A Case Study

Overview of political, social and economic context

The year 1994 saw the toppling of the apartheid regime, the election of Nelson Mandela as the first black president and the inception of a long and arduous political, social and economic transition in South Africa. From a policy of extreme racial stratification, the country took its first steps towards non-racialism and reconciliation. Thirteen years later progress is palpable, yet large inequalities remain.

Political

Among the slew of delicate challenges facing South Africa on the eve of its re-birth in 1994, was the creation of a non-racial, democratic government system. Up until then, the main purpose of the state was to maintain the provision of exceptional public services to the white minority. In an effort to equalize the political terrain and ease racial relations, many blacks were offered positions at the expense of white civil servants' expertise. Consequently, ministries, hospitals and schools are experiencing difficulties finding skilled people to fill vacancies. In response to these inefficiencies, the government has initiated projects to provide greater opportunities for black education and employment. Many of the statistics detailed here are drawn from (South Africa Yearbook, 2005-06), (Szeftel, 2004), (Bhorat, 2002) and (The Economist, 2007).

Politically, South Africa has come to resemble a single-party state. Despite its status as a democratic country, there is a dearth of political criticism and opposition. A consolidation of power has occurred, such that the president elects his own ministers, the provincial premiers and mayors of large cities where the African National Congress (ANC) won the majority of votes. The Democratic Alliance, the main opposition party, appeals primarily to the white and colored contingents; a mere one-tenth of its supporters are black. This bodes ill for the party in a country where blacks comprise some 80% of South Africa's 47 million people. Consolidation has given rise to fears of President Thabo Mbeki perhaps seeking a third term, despite constitutional term limits and South Africa falling into the post-colonial, despotic, authoritarian state mould of so many of its African compatriots. (Szeftel, 2004:199) There has, however, been a splintering of views within the ANC. Opposition has surfaced from left-wing members of the ruling party. The integrity of the ANC has also been called into question by corruption charges within its National Intelligence Agency, involving surveillance and a political plot to prevent Deputy President Jacob Zuma-- who himself was accused of rape and corruption-- from ascending to the presidency.

Recently South Africa has also been criticized for its unwillingness to condemn the human rights abuses and election rigging of President Robert Mugabe's regime in Zimbabwe. (Szeftel, 2004:200) Publicly, South Africa seeks to uphold the notion of African unity, but undercurrents of alarm shift below the surface. As Mbeki's second term draws to a close, we can highlight three main focus areas for the

government-- reduction of poverty and unemployment, consolidation of state powers and strengthening of democracy and promotion of an African renaissance and unity. (Szeftel, 2004:197)

Social

South Africa has long been home to a people with a plethora of creeds, ethnicities, beliefs and races. Dubbed by Archbishop Desmond Tutu as “the Rainbow Nation,” this rich cultural character is both what gives the country its strength and makes it difficult to govern. A leveling of the social playing field has been underway, as decades of racial disenfranchisement are being undone. An attempt at providing greater opportunities for non-white South Africans has manifested itself in numerous government policies. Racial segmentation can still be seen in the civil and security services, land distribution, property rights and the legal arena. Although racial tension still exists, it bears only a blurry resemblance to the “prejudice and animosity of the past.” (Szeftel, 2004:196)

While in 1970 whites accounted for 71% of the personal income in the country and blacks another 20%, by 1990, the percentage of white personal income had fallen to 54%, that of blacks’ had risen to 33%. Similarly, the richest 10% of the population in 1975 was 95% white; these figures had changed to 22% black, 7% colored and 5% Indian by 1996. It is apparent that change is occurring, albeit gradually.

Educational opportunities for blacks have also expanded considerably since the end of apartheid. Almost all South African children are now attending primary school. The government allocates 20% of its budget to this cause, but despite this, many complain of the low quality of education offered in public schools. State-funded higher education rates have increased as have the overall numbers of females and black students respectively (South Africa Yearbook 2005-06:58) According to Statistics South Africa, in 2003, 5.2% of blacks aged 20 years or older surveyed had completed higher education, compared to 29.8% of whites. Consistent with this, some 22.3% of blacks and 1.4% of whites indicated they had “no schooling.” This highlights a need for further targeted action on the provision of quality education.

The legacy of inequality can also be observed through South Africa’s high rate of poverty. In 1995 48% of the population and 28% of the households were living below the poverty line.¹¹ (South Africa Yearbook 2005-06:55) By 1999 this number had increased to 3.7 million households (or slightly less than 33%) with a total of 11.4 million living below the poverty line. 2001 witnessed a slight decrease in these numbers, but some 34.1% of the population still lives on less than \$2 USD per day indicating that while progress has been made, poverty remains a key issue facing the country. (UNAIDS, 2007) Policies have been established to alleviate this situation, including the provision of social income grants, expanded public works programmes, housing and shelter subsidies, land redistribution and electrification schemes.

Crime is another significant obstacle facing South Africa. Statistics taken from the South African Police Service indicate that, overall, crime is decreasing and/or stabilizing. (South Africa Yearbook 2005-06:65) Murder decreased by 5.6%, attempted murder by 18.8%, common robberies by 5.3% and aggravated robbery by 5.5% between 2003/2004 and 2004/2005. Some areas of crime, however, witnessed an increase, including drug-related crime by 33.5%, robbery of cash in transit by 14.6%, indecent assault by 8% and rape by 4%. (South Africa Yearbook 2005-06:65) Stories circulate of violent crimes occurring in often underprivileged areas.

The HIV/AIDS epidemic has also drastically affected the fledgling democratic state of South Africa. Some 5.5 million people are living with HIV, and close to 1000 people die from AIDS every day. The AIDS budget for 2005/2006 was 2.6 billion rand, which enabled 111 827 people access to free antiretroviral treatment by the end of December 2005. (UNAIDS, 2007) Although efforts have been made, President Mbeki is openly hesitant to state that HIV does indeed cause AIDS, and the health minister Manto Tshabalala-Msimang has advocated beetroot, garlic and traditional medicine as treatment for the virus. Ambiguous views on HIV treatment and the link between HIV and AIDS have meant the crisis rages on seemingly unabated.

¹¹ This figure is calculated by looking at expenditure without access to services and assets.

Economic

The end of apartheid and ensuing shift towards democracy instigated economic development and South Africa's re-entry into the global market. (Marks, 2006: 172) Through various international cooperative agreements—Trade, Development and Co-operation Agreement with the EU, Southern African Development Community Trade Protocol—South Africa has been able to expand its network of trading partners and encourage foreign direct investment.¹² (South Africa Yearbook 2005-06:60)

The nation is benefiting from a level of macro-economic stability it has not seen for 40 years. (South Africa Yearbook 2005-06:60) During apartheid, per-capita growth was negative. Since then it has steadily increased at an average rate of 2.94% per year. In terms of real growth, South Africans benefited from a 1% increase in wealth per year since 1994. (South Africa Yearbook 2005-06:60) In the past three years it has grown by more than 4%. Trevor Manuel, the finance minister, noted in May of 2007 that the country had a budget surplus for the first time in history. With only 6% of sub-Saharan Africa's population, South Africa brings in over a third of the region's GDP. This relative excellence is due in large measure to the weak economies of the region, as significant challenges have yet to be surmounted.

Between 1995 and 2004, the number of unemployed people went from 1 909 468 to 4 532 000, an increase of 2 632 000. However, since the early 2000s, the overall unemployment rate has fallen. It remains high at about 25%. Part of the reason for this high rate is the restructuring that has disadvantaged many low-skilled workers. South Africa has been undergoing a shift from the predominance of agriculture, mining and low skilled labor to the service sector, notably the financial and business services and high skilled labor. The departure of highly skilled migrants has created a labor gap. In response, efforts have increased to encourage the return of highly skilled workers and to promote migration within the Southern African region. (Bhorat et. al, 2002)

Causes and characteristics of South African immigration to Switzerland

From the night of apartheid arose multifarious possibilities for re-birth through the creation of an egalitarian state in which the color of your skin and your gender would have no bearing on your quest for life. Since 1994 significant improvements have been made towards achieving this ideal, but great challenges are never easily overcome.

The South Africans that we interviewed represent a broad swath of society, painting a picture that weaves in different professions, home regions and cities, socioeconomic backgrounds, ages and gender. Their testimonies give unique insight into the underlying causes and motivations for migration, current socio political and economic trends unfolding in South Africa and ways to positively impact these trends.

The highly skilled South African migrants interviewed presented an array of reasons for their relocation to Switzerland. Twenty-nine percent (5/17) of the respondents noted better educational opportunities as reasons for leaving. Financial and professional attraction also lured some into migrating. Forty-seven percent (8/17) of those surveyed underscored their desire to emigrate in order to excel professionally; a further two were transferred by their employers and looked forward to the new opportunities.

The high crime rate in South Africa and increasing incidence of rape (4% increase between 2003/2004 and 2004/2005) discouraged two of the seventeen respondents from staying in their home countries. (South Africa Yearbook 2005-06:65) As rape disproportionately affects women, it was not surprising

¹² The Trade Development and Cooperation Agreement between the European Community and South Africa established bilateral trade arrangements between the two entities. The key component of the agreement is the "Free Trade Area" stipulation which facilitates better trade relations and increases access to each's access to the other's market. ("Trade, Development and Cooperation Agreement, 2004) The SADC Trade Protocol, which came into force 25 January 2000, endeavors to create a free trade zone spanning the member's states in Southern Africa. (Madakufamba 2000)

to note that these two respondents were women. Such fears are warranted in a country where, between 2003-2004 52,733 people were raped. (Rape Crisis Cape Town Trust, 2007) These migrants' views and the statistics speak volumes about the need to reduce rape, curb crime and provide greater chances for people to pursue life's opportunities. Restrictionist policies in education, lack of professional opportunities and extreme censorship all encouraged migration of highly skilled workers. However, not all of the motivations behind migration were negative.

Twenty-four percent (4/17) respondents cited love as the reason for their emigration. While one was in a cross-racial relationship and felt it would not be accepted in South Africa, the others fell in love with Swiss nationals who became their partners. Four of the respondents had either family or friends living in Switzerland who encouraged them to seek employment or pursue educational studies here. These kinds of support systems played an important role in convincing these five respondents to leave their countries of origin. Those in the diaspora, with their expert understanding of South African lifestyles and cultures, could positively and significantly influence their home country, attacking just those issues that forced them from their homes initially.

The living and working conditions of highly skilled South African in Switzerland

Along with uprooting oneself comes a host of difficulties including language barriers, finding housing, gainful employment, friendships and relationships, adjusting to different cultures, lifestyles, mindsets and weather patterns. The migrants interviewed cited many such challenges in their transition to living in Switzerland.

While South Africa and Switzerland are polyglot countries claiming eleven and three official languages, respectively, the two countries share none in common. (BBC Website, 2007) Consequently, language was one of the most significant obstacles faced by respondents upon arrival in their new country of residence. Eighty-two percent (14/17) of those interviewed cited language as the main difficulty they faced. Four of the fourteen learned French in order to get around through courses and family support. A further two learned French through starting a relationship with a francophone. The others did not indicate how they dealt with this obstacle.

While the main obstacle facing the migrants interviewed was language, housing and the expensive cost of living in Switzerland were cited by 29 % (5/17) of the respondents as areas of difficulty in their transition. Adjusting to Swiss cultures and ideals proved difficult for 41% (7/17) of the migrants, who noted many differences between Switzerland and South Africa, ranging from communication patterns to value systems and gender roles. Some 24% (4/17) of the respondents noted positive aspects of their transition and lives in Switzerland, including the cleanliness and efficiency of the Swiss.

Another significant area of concern for migrants in transition was the conciliation between the professional and personal spheres. Our research indicates that responses to this merging of worlds are very individualized, with answers ranging from one end of the spectrum to the other. Forty-seven percent (8/17) of the people noted their attempts to achieve a balance between work and personal life. Another 12% (2/17) of the migrants stated their desire to keep private and professional lives completely separate. A further 29% (5/17) underscored the need to focus more on the professional aspect, especially in the beginning of their relocation to Switzerland. Alternatively, 12% noted that their lives are concentrated on their private and personal lives. Twelve percent (2/17) of those interviewed elaborated on the linkage between their personal and professional lives, stating that they were very much intertwined.

With regard to gender roles, interesting views surfaced. Twenty-four percent (4/17) respondents, all women, stated that the Swiss system does not cater to working mothers. The schooling system in particular was cited for its rigidity that places constraints on them. The lack of affordable domestic care, space in daycare centers and distance from family were further difficulties faced by working mothers. One respondent remarked that the Swiss mentality forwards the notion that women should stop working after birth, whereas in South Africa there are support centers, daycare and familial support. She stressed, "I don't see my friends in South Africa having to choose to work or have a family, but this is the mentality in Switzerland."

Most of the respondents, 53% (9/17) stated that the majority of their friendships were with foreigners, while they also retained relationships with some South Africans and Swiss. Another 47% (8/17)

highlighted that the bulk of their social contacts are Swiss, and to a lesser degree, foreigners and South Africans. This indicates a great degree of mixing of South African highly skilled migrants with the local Swiss population, each other and other foreign communities. These findings give us insight into the main obstacles and transitions highly skilled migrants must make upon arrival in their new countries of destination.

Brain gain: mechanisms, strategies, opportunities, challenges and impact on development of South Africa and Switzerland

Three brain gain mechanisms have been identified as highly successful in transferring knowledge from the highly skilled in the diaspora to their counterparts in the South—the creation of scientific diaspora networks, research and experimental development and north-south research partnerships. To uncover whether such initiatives are already underway between highly skilled migrants in the diaspora in Switzerland and South Africa, respondent elaborated on their contacts with their country of origin and country of residence.

Some 71% (12/17) respondents maintain contacts with South Africa. Of these, four out of seventeen described them as professional-- either instigated through the formal channels of their work or in hopes of possibly collaborating in the future. Fifty-three percent of the migrants keep contacts with their country of residence, all save one of which were described as “professional contacts.” At the regional level, 29% (5/17) have exchanges; of these, 80% (4/5) of them are work-related contacts; the final one was not specified. Another 47% (8/17) respondents have international contacts, of which all save one were work-related.

In terms of knowledge transfer specifically, many interesting initiatives that benefit South Africa were noted. Four respondents indicated that they informally act as ambassadors for South Africa while living in Switzerland by increasing awareness of the country’s social, economic and cultural environment. In so doing they hope to promote intercultural sensitivity and South Africa’s standing on the world stage. One respondent highlighted her efforts to fuse knowledge about South Africa and its economic and business potential into the curricula for her courses. This proved an effective way of introducing students with little exposure to South Africa.

With regard to research and experimental development, initiatives were extremely limited. Only one respondent indicated efforts in this area—through his position at work where he transfers business knowledge from Switzerland to banks in South Africa. Such knowledge could prove invaluable in a country experiencing a rapid economic transition and growth.

Looking at north-south research partnerships provided different insight. Two very interesting projects were cited. The first involves improving the research capabilities of South Africa and investigating the linkage between math and public health towards the creation of better governmental policies. The second project highlighted is a Swiss-South African inter-institutional exchange program based in Basel.

For the remaining ten respondents, 24% (4/17) indicated that the opportunity had never presented itself to them and they had never actively sought it out. High work load and lack of time to initiate personal projects were noted by 12% (2/17) of the respondents. One migrant underscored her desire to start a student exchange between universities in South Africa and her institution Switzerland, but noted a lack of motivation from the latter. Responses were not specified by the remaining respondents.

Not all of the undertakings in which those interviewed were involved fell neatly into the three brain gain mechanism categories. Forty-one percent (7/17) of the respondents highlighted different types of projects in which they play a role. Two stated that they make donations and support organizations in less resourced areas than South Africa. One person elaborated on the transportation of her children’s old clothing to South Africa, where she distributed it to orphaned children with AIDS and those emerging from dysfunctional homes. Another person devoted Sundays to teaching under-privileged children to swim. One migrant worked for the Nelson Mandela Children’s Fund and helped create a partnership between community-based organizations in South Africa and those in Canada. The sixth writes articles and takes photos of events associated with Africans residing in Switzerland for the Swiss-based AfricaLink magazine. Another respondent hopes to launch a market in Switzerland for South African fine arts and handcrafted goods. Clearly, many interesting initiatives are already

underway between the diaspora and South Africa. In terms of retaining personal links with those who remained in South Africa, strong connections were noted by all those interviewed. Through their various professions and expertise, the pool of highly skilled migrants interviewed has a wealth of skills to offer their country. One respondent helps contribute to the acceleration of the quality of science and technology in his home country, which helps create jobs. Sometimes new products

introduced are based on technologies that can have a beneficial impact in other fields, like public health. Another's work could significantly improve governmental policy on public health. An understanding of relations between international organizations and countries could be increasingly useful as South Africa gains ground and credibility as an international power. Promoting trade export capacities in South Africa could increase investment and help grow the economy, as could helping build capacity in small and medium enterprises and improving and extending financial services to South African banks and individuals—three areas on which three respondents focus. Aligning new technology and capacity

Highly Skilled Migrants Best Practices:

- ❖ Fusing economic and business knowledge about South Africa into masters-level coursework
- ❖ The SACEMA project which provides masters-level courses for African students, teaching them to apply mathematics to solving public health issues and investigates how these can translate into governmental policies
- ❖ Swiss-South African inter-institutional exchange program based in Basel
- ❖ Transporting clothing to shelters and refuges for orphaned children suffering from HIV and emerging from dysfunctional homes
- ❖ Teaching underprivileged children sports to which they have had little exposure
- ❖ Working for the Nelson Mandela Children's Fund to create partnerships between businesses in the North and small, grassroots organizations in South Africa
- ❖ Contributing to the Swiss-based publication, *AfricaLink*, which documents information associated with Africans residing in Switzerland
- ❖ Launching a Swiss market for hand-crafted South African

building for business leadership could also help grow the South African economy and change notions that European and American schools are superior. This is another area in which highly skilled migrants from South Africa excel. Another person's air traffic proficiency could help South Africa learn about the European license and competence scheme, improving overall air traffic norms. Highlighting awareness of South Africa's potential through coursework could help dispel misguided notions and increase cultural sensitivity. A respondent's skills in foreign language acquisition could be helpful in an ethnically and linguistically divided country that claims twelve official languages. The psychological competence of a third respondent could help families, especially in a country with South Africa's history.

The plethora of skills and expertise the migrants interviewed have to offer has tremendous potential to positively influence their country of origin. Proper channels must be deepened to enhance these possible contributions.

Scientific diasporas and development of country of origin: which scientific policies and which development policies?

Many migrants tend to create forums in which they can associate, socialize and meet their fellow countrymen while living abroad. Whether their orientation is purely social or contains an aspect of social-economic-political development for their country of origin, these organizations bring nationals living abroad together.

Eighty-eight percent (15/17) of the South Africans interviewed were not part of any associations oriented towards their country of origin. Seven migrants indicated a lack of visibility of these organizations and their objectives as the main reason for their lack of membership. One respondent stated that the thought had never crossed his mind. Two of these fifteen migrants underscored the need to create communities with a range of skills and networks for South Africans abroad, although they were not part of any such network.

Interesting comments about South Africa's social and cultural fabric were weaved into two respondents' comments on associations oriented towards their country of origin. Both stated that the South African population is highly divided, and that these cleavages extend to the diaspora. Many South Africans were disillusioned and angered by the legislation enacted after the end of apartheid. Consequently, such migrants do not always actively seek out other nationals from their country of origin. The remaining five migrants did not indicate why they were not engaged members of any associations.

Migrants' perceptions of their country of origin provided detailed insight into the main accomplishments achieved and challenges facing South Africa. With regard to the social situation, key themes were highlighted. Fifty-three percent (9/17) of the respondents forwarded the notion that a slow improvement and equalization of opportunities for different races is underway in South Africa. A further three South Africans noted that HIV/AIDS was a significant problem that deserved greater attention. With an adult HIV prevalence of 21.5%, these migrants voiced the firm opinion that efforts should be increased to combat this disease. One such person noted that poverty and HIV were killing as many as one in four economically active South Africans.

Poverty was also highlighted as an important challenge facing the migrants' country of origin. Forty-seven percent (8/17) of those interviewed underscored crime and poverty as significant issues. Forty-eight percent of the South African population lives below the poverty line.¹³ This alarmingly high rate, among other factors, has increased crime in the country. Forty-one percent (7/17) migrants named crime as one of their main worries with regard to South Africa's social situation. With 18,000 murders last year alone, crime has become an entrenched fear faced daily by many South Africans. This fear extends to those in the diaspora, many of whom have family and friends who remain in their country of origin.

Economically, the picture was similarly insightful. Some 29% (5/17) of the migrants believe there has been an overall improvement of the economic situation, but each added that the income gap between the wealthy and the poor was increasing. Unemployment was also noted alongside crime as a large problem facing South Africa. The staggering 25% unemployment rate is reflected in respondents' comments—29% of the migrants cited unemployment as one of the biggest issues facing the country. One person discussed the racial disparities in the economic and social conditions of the country, believing that the government must increase professional opportunities to reduce poverty and unemployment.

With regard to the political sphere, a variety of observations were made. Eighteen percent (3/17) of the migrants indicated that South Africa has a stable political position. Several respondents, 24% (4/17) worried about potential political conflict as President Mbeki's control over the country is consolidated and elections approach. Another two people emphasized that extensive corruption plagues the government.

In the scientific domain, four out of seventeen respondents believe their country has great potential, innovation and are pleased that greater funds are being allocated to scientific policies and research. A further four stressed that good scientific and technological research is being done, but one lamented the lack of initiatives focusing on public health.

Two respondents noted that brain drain was occurring; further to this point, one stated that the large outflow of white highly skilled migrants had led to a consequent influx of regional migrants. Another respondent corroborated this fact, stating that South Africa must increase its flexibility toward migration in order to compensate for the loss of skills. Two more migrants observed that restrictive laws make it difficult to work in their country of origin. Another of those interviewed remarked that

¹³ (<https://www.cia.gov/cia/publications/factbook/geos/sf.html>)

migratory forces balance each other and should not be regarded negatively. Regional immigration to South Africa helps fill labour gaps and encourages the notion that xenophobia against non-nationals cannot be tolerated. He noted that the country has significantly opened up to regional migration, which has filled gaps in employment and helped export useful lessons learned in South Africa to other areas of the African continent.

On a related topic, some 41% (7/17) respondents had vague notions of governmental attempts to encourage the return of highly skilled migrants. One person cited tax incentives and other private initiatives being undertaken to encourage return. Improving scientific and technological research, expanding on professional opportunities and making these opportunities known could have positive effects in encouraging people to return and even stay initially. Another respondent's words testify to this fact. She stated, "If I was aware of what I could do to benefit my own country within my own country professionally, then this would add more weight to the push factors <encouraging her to leave Switzerland>."

With regard to citizenship policies, one highly skilled migrant knew of the availability of dual citizenship, but believed the policies to be confusing. Alternatively, another migrant was a dual citizen, thankful for the possibility of owning two passports. She stated that "they would lose so many South Africans if they did not do this." Two people wondered if the country even has a formal migration policy. Greater and clearer information on the possibility of dual citizenship is necessary, especially for those embarking on emigration.

Swiss migration policy induced many reactions from respondents. Forty-seven percent (8/17) people saw greater restrictions being imposed on non-nationals wanting to reside in Switzerland. Two migrants described the Swiss migration system as appropriately restrictive, well-defined and clear. Of these, one stated that Swiss legislation strike a balance between "the influx of new migrants versus the specific industrial needs of the country and the overall required amount of human capital owing to the country demographics and GDP." He cautioned, however, that the model of three concentric circles could potentially limit Switzerland from tapping into skilled labor from developing countries that could add a great deal of value to the country.

Perhaps the most rewarding and interesting part of the research was the opinions and suggestions offered by migrants on how to expand on diaspora efforts to improve development in South Africa. Respondents posited a wealth of potential collaborations that could enhance work in this area. Seventy-one percent (12/17) of those interviewed voiced a coherent notion that associations geared towards South Africa should become more visible to raise awareness of these groups and their objectives. This would increase the diaspora's knowledge of its own members and the skills it has to offer South Africa. One migrant added that institutions and the government in South Africa should be informed of the composition of the diaspora and maintain communication, propose policies, establish greater cooperation, support projects and be informed of current endeavors being initiated abroad. Another person added that migrants must lobby the South African government for greater support and encourage diaspora efforts that benefit local communities. Additionally, a formal system should be established to encourage and support the role of the diaspora in impacting development. Overall, greater institutional and government support and knowledge concerning the diaspora are necessary.

Thirty-five percent (6/17) respondents underscored the need to enhance student and faculty exchange programs between Switzerland and South Africa. A formal strategy should be devised to increase the numbers of exchanges occurring between the two countries. Two other respondents seconded the notion that exchange partnerships with universities would be mutually beneficial. One respondent elaborated on the prospect of an exchange between doctors working in Switzerland who would visit South Africa and vice-versa. In this same vein, one migrant noted that the Swiss should take advantage of those receiving their education in their country, instead of forcing them to leave once their degree programs have culminated. Formalizing these channels of exchange would increase positive interaction and encourage the transfer of knowledge and expertise in a mutually beneficial manner.

Twenty-nine percent (5/17) of the migrants stressed a need to encourage forums for communication such as internet interfaces for people to discuss and exchange information on initiatives in benefit of South Africa. Information on such resources should be available through embassies, consulates and regional associations such as the South African Club of Suisse Romande, to really demonstrate how people can actively engage and positively impact their country of origin. Of these five, one person believes it would be good to have some kind of Swiss-South African network with information that

people would receive upon arrival in Switzerland. Another person added that embassies should support diaspora engagement in activities by contacting people in their databases about opportunities and associations dedicated to the development of South Africa.

Similarly, 18% (3/17) respondents forwarded the notion that the Swiss authorities should gather information on diasporas. It is in their interest to be aware of potential resources, endeavors and possible collaborations that could positively impact their country. This information should be readily available, and exchanges and collaborations should be formalized in agreements. Perhaps the rewards of such exchanges can be best summarized by one respondent when he stated, "Both countries should identify areas for mutual benefit and opportunity on a concerted basis."

Conclusions and policy recommendations

The multitude of ways in which the highly skilled South African migrants interviewed are engaged with their country of origin. From formalized brain gain mechanisms that have been documented to have a positive impact on development, to more grassroots level engagement such as donating clothing to orphans in South Africa, these migrants maintain strong links and exchanges with their country of origin. The task now is to enhance and deepen these exchanges to increase the beneficial impact on development.

Greater awareness of current initiatives and collaborations between South Africa and Switzerland in the academic, professional, scientific and research-based spheres is necessary. Increased dissemination of information on the content and skills of the South African diaspora in Switzerland is also necessary. The South African government must increase communication with the diaspora to remain informed of different initiatives, provide financial and other types of resources, propose policies and new projects and enhance collaboration with Swiss academic and scientific entities.

Academic, inter-institutional exchanges should be increased and formalized to broaden channels for the flow of knowledge, technology, financial and other resources and social understanding. Greater forums for communication, including conferences and seminars devoted to engaging the diaspora and promoting their role in development should be opened.

Associations oriented towards South Africa should increase their visibility, providing information on their objectives, structure and undertakings. Furthermore, associations should expand their mandates to include having a positive impact on the economic, social, technological or research-based development of South Africa. By deepening all of these channels of interaction, the South African nationals who comprise the scientific and professional diaspora can have a great impact on the social, economic, technological and academic development of their country of origin.

4.3 Colombia – A Case Study

Overview of economic, social and political context

According to data from the Colombian Economic Gazette (Boletín Económico de Colombia - April 2007) the Colombian economy has developed positively in recent years, showing significant perspectives for growth, mainly as a result of the increase in investment registered over the past five years. Investment in terms of GDP is expected to exceed 27% by the end of 2007, reaching a level similar to that of Chile in the process. Other positive factors are the increase in exports and remittances from abroad. On the other hand, the Gazette showed that direct foreign investment (DFI) was more than US\$ 6,000 million in 2006 or 4.5% of GDP, and these figures were expected to continue rising as a result of privatisation and further private sector investment in the coal, petrol and gas industries.

The macroeconomic data in themselves point to a very encouraging panorama. However, a large section of the Colombian population lives in poverty and does not have access to this economic growth. Colombia is a country with a growing economy; a country that is rich in valuable natural, cultural and

social resources. As is the case in other Latin-American countries, the country's wealth is distributed unequally among its inhabitants.

What sets Colombia apart at a social and political level as a case deserving special attention is its armed conflict, which has its roots at the beginning of the 1960s, and the rise of the Revolutionary Armed Forces of Colombia (FARC) and the National Liberation Army (ELN). In the 1980s the illegal drugs economy in Colombia became one of the most powerful in the world and since then the drug trafficking economy has penetrated all the institutions of Colombian society.

Today, the armed conflict mixes and confronts the different interests of a series of actors who are fighting for power: the guerrillas, the paramilitary groups, and organised crime groups. All classes, social organisations and territorial areas have been affected by the conflict and as a result, social violence is prevalent in practically all sectors of the social framework (Romero, 2003). In addition to all this, there has been an erosion of legality and the state of law.

In its desire to contribute to the disintegration of the guerrilla forces and to the resolution of the conflict, the current government of President Alvaro Uribe (re-elected for the 2006-2010 term) promised a democratic security policy, which would re-establish public order. With this in mind, Uribe has initiated peace negotiations aimed at dismantling various paramilitary groups and he offered an amnesty, through the controversial Peace and Justice Act. His actions have created many expectations among Colombian society.

A parallel consequence of the armed conflict is the humanitarian crisis faced by Colombia as a result of the high number of persons who have had to leave their homes. According to data from the IOM (2005), Colombia had about 2.5 million internally displaced people at the end of 2002. This figure represents one of the largest populations of IDPs (Internally Displaced Persons) in the world. According to data from the same source, more than 1.2 million Colombians have emigrated since 1997.

In 1968 COLCIENCIAS (The Colombian Institute for the Development of Science and Technology) was created as the entity in charge of Science and Technology in Colombia. However only at the end of the 1980's Colombia began to recognise the importance of science and technology for socio-economic development (Posada Florez, 2002). Today, one of COLCIENCIAS current initiatives is its "Strategy to Take Advantage of the Scientific Diaspora", designed to take maximum advantage of the capital of Colombian scientists overseas. Vitalising the Caldas Network of Colombian Scientists Abroad to achieve significant results in international co-operation and in the development of joint projects is one of the strategic objectives of COLCIENCIAS established in 2006 (Guerra de Mesa; 2006).

With regard to the situation of investment in S&T in Colombia, according to the Network of Science and Technology Indicators (<http://www.ricyt.edu.ar>), the GDP of Colombia reached US\$ 81,719 million and investment in S&T amounted to US\$ 252 million in 2001. In 2001 investment in S&T activities represented 0.31% of GDP while investment in R&D was 0.17% of GDP. Both these figures were the lowest investment percentages in GDP terms since 1995. Investment in S&T by type of activity is divided as follows: 24% goes to basic research; 29% to experimental development; and 47% to applied research.

On the other hand, ICETEX is the entity of the Colombian government in charge of channelling the offer of scholarships in international co-operation which the governments of other countries and international bodies offer to Colombians.

Finally, for the purposes of this project, it is important to mention the policy regarding double nationality that applies in Colombia. Current Colombian legislation applies the policy of double nationality, according to which "no Colombian by birth may be deprived of his/her nationality. The status of Colombian nationality is not lost as a consequence of acquiring another nationality" (Article 96 of the Political Constitution, reformed in January 2002).

Causes and characteristics of high-skilled Colombian migration in Switzerland.

Twenty-four (24) in-depth interviews were conducted with Colombians (thirteen (13) women and eleven (11) men) aged between 28 and 62, living and/or working mainly in Lausanne and Geneva, and to a lesser extent in Berne and Basel.

Although the factors and motives for the emigration of highly-qualified Colombians to Switzerland are varied, the main reason is mobility for study and training purposes, and to a lesser extent for

professional reasons, family regrouping or marriage or for socio-economic and political reasons. In this way, the determining factors and causes behind Colombian immigration in Switzerland can be summarised as follows: factors types 1) studies/training; 2) professional; 3) family regrouping / marriage; and 4) socio-economic.

The matter of studies (Postgraduate and PhD) and scientific training (PostDoc) represents the most important factor to explain the presence of qualified Colombians in Switzerland. This presence is very significant in the French part of Switzerland but not so great in the German part. For example, the number of Colombians doing post-doctorates at the EPFL and the UNIL is very high; while at doctorate level, according to data from the two Swiss Polytechnic Schools, the EPFL has eight (8) Colombian PhD students during the 2006-2007 academic year, while ETHZ had none. It is important to point out that the presence of highly qualified Colombians in Switzerland is greater in the French part than in the German part, and that in general they have a good reputation in terms of their excellence and scientific performance, an image that is not appreciated as much in the German part of Switzerland.

Of the twenty-four (24) Colombians interviewed, fifteen (15) came to Switzerland to study or train and of these ten (10) came to the EPFL.

“I came due to an intense passion for science and professional and scientific achievement because at high research level there was no PhD in Colombia in my field.”

PostDoc in Chemistry and Microtechnology

The Colombian scientists who emigrated for studies and/or training purposes said the limitations in some scientific areas in Colombia were a significant *push factor*. In this context, those interviewed mentioned that the lack of finance for knowledge activities, the shortage of materials and equipment, as well as the small number of research positions means that the levels of scientific excellence as well as the resources and infrastructure available are better in Switzerland than they are in Colombia. One (1) scientist mentioned that there were no doctorate programmes in her specialist area when she left Colombia.

“Colombia has high education and PhD programmes but it has less resources, so excellence in education is hard. In chemistry there are not enough equipment or instruments. I wanted the opportunity to observe how Europe works and how it does science. I was willing to be trained and to learn state-of-the-art techniques, and then go back to my country and make a contribution.”

*Researcher, PhD student in Chemistry in Switzerland
Professor in Colombia*

Engineering, medicine and biochemistry were the training areas best represented by the Colombians who were interviewed. For the OECD, student mobility offers a potential pool of qualified workers, whether it be during their study years or subsequently in the form of recruitment (OECD, 2004). This hypothesis of a transformation from migration for studies to migration for work applies repeatedly in the Colombian case: of the fifteen (15) Colombians who came to Switzerland as postgraduate or doctoral students or to do a postdoctorate, twelve (12) entered the labour market once they had completed their postdoctoral studies or training. The other three (3) are currently continuing with their studies or training.

Personal and family relations play an ever more important role as factors determining the causes for migration. In this context, the family regrouping/marriage factor occupies second place in terms of importance for the highly-qualified Colombians who emigrated to Switzerland, and there is a significant gender dimension behind the migratory patterns and, contrary to what is generally believed, many women who arrive in Switzerland for family regroupings or marriage are highly-qualified (Riaño, 2003).

Accordingly, four (4) highly skilled Colombians came to Switzerland for family regroupings or marriage reasons: to be more precise one (1) came to Switzerland to follow her Colombian husband in his scientific career, and three (3) did so because of marriage to Swiss citizens - one (1) of these combined this factor with an offer to do a post-doctorate-.

Professional reasons is the third factor in importance among highly qualified Colombians emigrating to Switzerland. Accordingly, three (3) Colombians came with the express intention of carrying out a

lucrative activity and following a professional career. Two (2) of them came with work contracts after being recruited by international organisations in Geneva, and one (1) Colombian woman came with a work contract with an important pharmaceutical company in Basel. The professional migration of two (2) of these was made easier by family contacts in Switzerland and one (1) because of the network of professional and social contacts he had built up during a previous period as a PhD student in Geneva.

Finally, socio-economic reasons were behind the decision of two (2) respondents to leave Colombia in search of better opportunities and professional prospects. In fact, one (1) of them came 30 years ago and made his professional career here, while the other came already holding a MA Diploma.

With regard to other significant reasons for their migration, those interviewed recognised some important *pull factors*. Four (4) respondents mentioned the opportunity for training and/or of following a scientific career within an excellent academic and research environment; two (2) highlighted the quality of life, stability and security that Switzerland has to offer; five (5) mentioned family contacts and social networking; three (3) mentioned previous scientific and professional contacts; and eight (8) indicated bilateral cooperation - the scholarship and scientific exchange programmes.

Diverse scholarship programmes, from both Swiss and Colombian institutions, have also played a key role in the opening of possibilities for Colombians to pursue their studies abroad. Nine (9) respondents came to pursue their studies and research with the support of scholarships. Two (2) respondents received a scholarship when they were already in Switzerland. The scholarships and funding institutions that have supported Colombians are: the International PhD Programme from the Swiss National Science Foundation (SNSF), the Marie Heim-Vögtlin Programme from the SNSF, the EPFL-SDC Fund, the ICETEX (Instituto Colombiano de Crédito Educativo y Estudios Técnicos en el Exterior), ESKAS (Eidgenössische Stipendienkommission für ausländische Studierende), Colfuturo, COLCIENCIAS, as well as scholarships from the French and the German governments and from the Max Planck Society.

“After a first short stay in Switzerland due to my husband’s scientific career I went back to Colombia with my two children to finish my studies there and then came back to Switzerland in 1995. I did the equivalent of my Diploma at the UNIL and started a PhD thanks to the Marie Heim-Vögtlin Programme - a special scholarship from the Swiss Confederation for women, who like me, were taking a professional break to be with their children. This scholarship financed my PhD.”

Senior Postdoc researcher in Immunology

The Colombian case study shows that scientific exchanges programmes at a university-university collaboration level have played also an important role in highly skilled migration, though a great part of this collaboration is actually based on the individual efforts of the scientific diaspora (scientist-scientist level of collaboration). In fact, the constant professional contacts and scientific exchanges between some members of the Colombian scientific diaspora in Switzerland and their counterparts in the country of origin have played a significant role in the ongoing stimulation of skilled Colombian migrants. Six (6) of those interviewed mentioned two members the Colombian scientific diaspora, who have been in Switzerland for more than 30 years and who hold stable positions of a high academic level at the EPFL and/or at the Yverdon School of Engineering (HEIG-VD), as their principal source of information for the scholarship programmes or the possibilities of assistantships. These scientists were also founder members of ACIS (Association of Colombian Investigators en Switzerland) and they continue to play an important role in its promotion. According to the President of ACIS, *“At least 20 PhD students have come to Switzerland to do projects thanks to them and as a result of their individual efforts.”*

At different times, scientific and student mobility also acts as an important element in the experiences of high skilled Colombian migrants. The dynamism of Colombian scientists is in itself an interesting contribution, if we recognise that science benefits from the nomadism of scientists (Meyer, Kaplan and Charm, 2001).

“In the scientific world, mobility and scientific exchanges are very important. I left Colombia to pursue PostDoc research in parasitology at the University of New York due to contacts I had established in Bogota. From there I came to Lausanne to test some new technology. My three-month visit ended up with publications at the highest scientific level. After that a collaboration agreement between the Ludwig Institute and the University of New York offered me the possibility of coming to Switzerland for a Postdoc. Afterwards I had the chance to go back to Colombia but I got an offer with a career perspective and I stayed”.

*Medical Doctor, Professor and researcher
PhD and PostDoc in immunology*

In this context, most (14) of the Colombian immigrants interviewed spent time in other countries for educational and/or professional reasons before they came to Switzerland, while ten (10) came directly from Colombia. The different migratory routes which the respondents followed for educational and/or professional reasons before coming to Switzerland included Russia, Spain, United States, France, Chile, Germany, United Kingdom. Five (5) Colombians returned to Colombia temporarily but returned later and re-established themselves in Switzerland (in some cases passing through a third country), especially to accept new professional or training opportunities that were better than those offered in their country of origin.

“I studied at the National University in Bogotá and during my three years there were many strikes and interruptions. I looked for opportunities to finish my studies abroad and got funding from a mix of sources - mainly my parents and ICETEX- to go to England for 3 years (...) After returning to Colombia and then to England again to pursue PhD studies, my PhD director put me in contact with the ETHZ, where one of the most important professors in the field of organic chemistry accepted me for Postdoc research and that was a very important opportunity.”

PhD and Postdoc in organic chemistry

The living and working conditions of highly skilled Colombian in Switzerland

The highly qualified Colombian migrants lived their first experiences in different and varied ways after their arrival in their country of destination. The spectrum covered all possibilities ranging from very positive and fascinating to very negative situations full of continuous obstacles. The positive elements emphasised by Colombians were: the opportunity to see and live in a new culture, the beauty of the landscape, a liking for the Swiss lifestyle, being well received and accepted by work colleagues, working in an excellent scientific environment, and the abundance of resources in the laboratory. The main difficulties faced by the qualified Colombians include: the language barrier, adapting to a new culture (and on occasions to a new life as well), adapting to the weather, adapting to a new rhythm and intensity of work, the difficulty of making friends and being far away from their families, failure to have their Colombian academic qualifications recognised, and in some cases sexual or racial discrimination.

Some common elements were observed independent of the place where the migrants' experiences were situated on the spectrum.

For seven (7) Colombians their first experiences in Switzerland were fascinating. This feeling was observed especially among those who had received scholarships under privileged conditions, those who arrived with contracts for postdoctoral studies, those who had lived in other countries before coming to Switzerland, and the few who knew the language. Thanks largely to the ACIS, the Colombian scientific community in Lausanne (especially at the EPFL and the UNIL) has created a very strong social network which has facilitated the first experiences of many in Switzerland. On the other hand, the professional international atmosphere in the academic environment and in some specific areas of industry such as pharmaceuticals has helped some Colombians to adapt. There is the case of one (1) person in the German part of Switzerland who does not speak German but who, nevertheless, because of his high level professional position in the industry, has never experienced any difficulties and who feels integrated and adapted.

For eight (8) of those interviewed their initial experiences in Switzerland were very difficult. One (1) of these people lived as an illegal immigrant and found it difficult to get a work permit. Only two (2) people mentioned the difficulty of obtaining a work permit. For many the language was the main barrier although most had learned French quickly (some of the scholarship programmes offered an intensive six-month course). For two (2) of the respondents who had to learn German and study the Swiss-German dialect the difficulty was even greater. Four (4) interviewees mentioned the fact that their qualifications were not recognised. Three (3) interviewees said that they felt discriminated against at first, but that this had changed once they had learned the language or had become integrated in the professional sense.

Seven (7) of those interviewed mentioned the hard work in a very demanding professional and/or scientific environment as one of the main obstacles. Frictions and a bad atmosphere in the laboratory, depression and, even in one case, sexual harassment were other difficulties that were reported.

“I did not get a work permit because I was accompanying my husband who was doing a Postdoc (...) Then, when I got the job I did not have the work permit, so I worked as a nanny until I got the work permit; my argument was that I had a specialization in malaria that nobody here had. So I received a Conjoint Permit and was valid only if my husband had also a permit. (...) Once I felt discriminated when somebody treated me as a foreign woman without basic education and skills.”

Senior Postdoc researcher in Immunology

For six (6) Colombians their arrival Switzerland brought a mixture of good and bad experiences. We have the paradigmatic case of one (1) Colombian woman, who lived through a double experience, first a very positive experience upon her arrival in Lausanne and after, and in contrast, a negative experience on arriving in Zurich. This shows that Switzerland offers at least two very different environments for qualified migrants.

“I lived in Lausanne 2 years and my experiences at EPFL were very positive; I learnt French easily and people accepted my skills. When I moved to Zurich to change my study programme I started to be confronted by many difficulties. I felt discriminated against at the ETHZ for being a woman and for being from a developing country. (...) At ETHZ my diploma was not recognised whereas they did recognise it at the EPFL. In society I also felt discrimination because of my racial origin; to feel accepted was harder in German Switzerland than in the French part (...) My ethnicity in Canada was something positive for the principle of visible minorities and diversities, the opposite occurs here. In Canada they first see your qualifications and then your physical aspect. Here I always had to prove that I was better than people thought. (...) I worked very hard to study German besides my Diploma and even followed a course to understand dialect. When I learnt the language people started to treat me differently.”

Lecturer and researcher; PhD in Social Geography

As far as gender roles are concerned, especially with regard to combining one's private and professional lives, for eight (8) of the interviewed women who have children, balancing their responsibilities as mothers and as professionals or scientists in Switzerland represents a major challenge. Six (6) of the women who were interviewed expressed their disagreement with the role that society gives mothers in Switzerland, in the sense that it is assumed that they will stay at home to look after their children. A professional female engineer working in industry said that *“the Swiss system is not designed for working mothers but rather it demotivates them in their personal decisions of wanting to do both tasks, unlike the case in Colombia where the system is designed so that women can have a family life and a professional life at the same time”*.

Some additional difficulties faced by qualified migrants with small children, who are trying to combine their private and professional lives are: the “block” timetables of Swiss primary schools and the restricted number of places at kindergartens. Three (3) women had to take a work break because they couldn't find a place at a kindergarten. Moreover, the lack of family back-up to help working couples with the care of the children and the lack of domestic help for housework are two additional elements that influence the way of combining private and professional lives in Switzerland and this contrasts with the situation in Colombia. Nevertheless, it is important to mention that sharing the house work and family tasks is common practice among qualified Colombians in Switzerland, while this practice is not so widespread in Colombia.

“Switzerland lives in a big paradox since it is a very developed country but its society is still very conservative in the society's mentality towards mothers because women are supposed to stay at home taking care of their children. Day care places are very limited. I stopped my job during one year because I did not have any day care place for my son. (...) Now I work 60% 3 days a week.”

*Engineer in Electronics, Consultant SAP in Logistics
MA in Logistics Systems*

Seven (7) of those interviewed mentioned the respect for one's free time and one's family and private life in Swiss professional culture as something very positive. The flexibility offered by academic life and the possibility of part-time jobs are other elements that favour combining one's private and professional lives. However, it is also observed that many scientists and professionals in high level positions work long hours each week and that they have little time for family life.

On the other hand, the interviews revealed some interesting facts about the contacts that Colombians maintain with other national communities and with the local community. While half of those interviewed (12) have a mixture of contacts: Colombians, Swiss people and the international community; five (5) have more contacts with the international community than with people from Switzerland or Colombia; four (4) socialised with Swiss people and Colombians on an even basis; and three (3) mainly have contacts with the Colombian community, and to a lesser extent with local and international ones. Of these one (1) Colombian did not know any Swiss people and only socialised within the Colombian community. This person, who is here on a temporary basis, mentioned that he had difficulties when he arrived in Switzerland and that he did not feel that he had adapted, and accordingly he did not experience any transactional sentiment.

Brain gain: mechanisms, strategies, opportunities, challenges and impact on development of Colombia and Switzerland

To identify *brain gain* initiatives and the mechanisms used by qualified Colombian migrants in Switzerland, the interview focussed on the relations between the migrants and their country of origin while it also bore in mind the professional contacts and exchanges at an international level of these migrants in their country of residence. This information helped us to discover the real or potential impact of the Colombian scientific diaspora as well as some opportunities from which both the country of origin and that of destination could benefit.

Of the twenty-four (24) Colombians interviewed, fifteen (15) have or have had contacts and/or scientific and professional exchanges with their country origin at different levels of intensity and in different ways. Of these, two (2) maintain sporadic contacts and thirteen (13) maintain scientific and/or professional exchanges on a permanent and systematic basis. These actions to promote the exchange of knowledge include: carrying out evaluations for COLCIENCIAS and for other public bodies; maintaining relations with government officials in Colombia; finding niches for research; providing resources for the initiatives of Colombian organizations; linking NGOs in Colombia with social entrepreneurs and philanthropists in Switzerland; giving advice to Colombians who wish to apply to Swiss programmes or institutes; giving lectures and tutorials; carrying out research projects there; promoting student and researcher exchanges; doing joint publications and joint research projects; participating in Conferences and Congresses; research collaboration; accepting advisory contracts with private firms; and providing research advice on an informal basis.

“I give courses and teach in Colombia; I have research projects there; I do students exchanges; I do joint publications with Colombian partners and collaborators; I maintain a level of permanent scientific cooperation with Colombia. (...) I have not followed any specific strategies; the initiatives are based on a strong affective capital I have for Colombia and in a need to fulfil the feeling that I am giving something back because I am not there”.

Lecturer and researcher; PhD and Postdoc in Chemical Sciences

Seven (7) Colombians do not maintain any contact or exchanges with Colombia for the following reasons: lack of a network of scientific or professional contacts there; lack of interest from their Colombian counterparts; lack of motivation and time; shortage of opportunities and lack of availability to work in private initiative; restrictions of the private sector due to confidentiality agreements; and also because of the need to establish themselves professionally before being in a position to collaborate

Most of the Colombians interviewed also keep up permanent exchanges with the scientific community in Switzerland as well as with the international scientific community. Some are members of associations, regional and/or international scientific committees, research consortiums, and/or scientific

journals in the areas of: organic chemistry; cancer; malaria, HIV and tuberculosis; the environment; ICTs; chemistry; biomedicine; physics; development; geography; women; energy; meteorology.

As far as Experimental Research and Development (R&D) is concerned, the following initiatives have been carried out by Colombians: transfer of technology at an industrial-university level; the ALPHA/Bio 200 project; application of research in the area of human rights and the concept of transnational justice; giving courses, conferences and advice to industry; advice for the creation and development of the internet in Colombia; direct assistance to PhD students, etc.

The North-South research partnerships worth mentioning include: the cooperation project between the EPFL and the University of the Andes on environmental and air pollution financed by the SDC; the assistance for the establishment of the agreement between CERN and Latin America; the design and promotion of a research project on Malaria between UNIL and Valle University; the design and promotion of the COCH project; etc.

Although most of the Colombians interviewed do not follow specific brain gain strategies and only base their pursuits on opportunity, motivation and personal interest, it is also true to say that constant communication, networking and forming part of the ACIS are elements which have helped to push the initiatives forward. Eight (8) respondents mentioned the lack of financial support and the limited financial resources as well as administrative and bureaucratic constraints in Colombia as the main difficulties to develop brain gain initiatives. Time constraint was also mentioned as an impediment. The main favourable circumstances to carry out brain gain initiatives are: the knowledge of both cultures and contexts; clear motivation; and prior scientific and professional contacts and networking. By listening to the lessons learnt by respondents, the messages goes equally to the countries or origin and destination: support has to come from both sides -the country of origin and the country of destiny-; adequate partners must be found, specially official sources that can help projects; need for structured and sustainable efforts.

“There are a lot of motivated people in Colombia but a structured and sustainable effort is needed to increase scientific levels. The best Colombian universities still have a long way to go to be at the scientific level of European universities in the field of organic chemistry. Education exchanges are needed; local support is needed; initiatives coming from outside lack viability if they are imposed externally and do not have local support.”

PhD and PostDoc in Chemical Sciences

“The South is full of innovative, creative experiences that could be of value to this part of the world, it needs more forums and exchanges to give them a voice.”

*Deputy Director and Senior Economic Counsellor
MA in International Economics and MBA student*

Finally two (2) respondents stressed the constraints related to the non recognition of Diplomas, a fact that limits every initiative; and one (1) respondent mentioned the fact that a high level of good will is required if people are to participate on their free time, which means extra work hours.

Concerning the links with the migrants' families in the country of origin, more than half of respondents (13) send financial remittances systematically and two (2) of them do this using a Bank card from their own accounts, which their families back home use when they need to. Three (4) send financial remittances only sometimes; one (3) Colombian are financing the studies of relatives back home. All twenty four (24) respondents maintain permanent communication with their families by telephone, Skype or email, and through mutual visits.

Further significant initiatives benefiting the country of origin and including transnational practices of highly skilled Colombian in Switzerland are: the COCH agreement; the initiative for the creation of a group of virtual laboratories with a group of Colombian colleagues; sponsorship of social projects to benefit the poor in Cali; the initiative of the Antioqueño Group – a group of highly skilled Colombian migrants from different backgrounds that tried to create a consultant firm to offer all their knowledge to Switzerland, with the idea of contributing to Colombia too.

The diversity and the value of the capacities and knowledge in different key disciplines for the development of Colombia to be found among the Colombian scientific diaspora en Switzerland together

with the affective capital of the migrants (“*I would love to have an impact in my country of origin*” was a much repeated sentence during the interviews) show the enormous potential on offer to the country of origin and the country of destination.

The question that needs to be asked here is how to strengthen and revitalise the resources of the scientific diaspora in a structured and systematic way, in the knowledge that the majority of them will not return to their countries of origin although they are interested in making a contribution. Twelve (12) of the twenty-four (24) interviewees do not intend to return to Colombia but they intend to build or strengthen the bridges between their country of origin and their country of destination; only three (3) intend to return in the short term; and another three (3) have plans to return to Colombia after retirement.

Highly Skilled Migrants Best Practices:

- ⇒ ***Scientific diaspora networks***
 - *ACIS (Association of Colombian Researchers in Switzerland)*
 - *Colect to link up Colombian students abroad; which was taken up by the Colombian government and became the Caldas Network*
- ⇒ ***North-South research partnerships***
 - *COCH project, in the area of agrobiotechnology between HEIG-VD in Switzerland, Biotec in Colombia and CIAT, international*
 - *Proposal for an agreement between CERN and Latin America*
 - *Research project on Malaria between UNIL and Universidad del Valle*
- ⇒ ***R&D***
 - *ALPHA/Bio 200 Project*

The creation of the ACIS (Association of Colombian Researchers in Switzerland) was an original and recognised *brain gain* initiative of the Colombian scientific diaspora in Switzerland and it has gone through different stages and levels of dynamism since its creation. The ACIS is a scientific association set up to create collaboration links between Colombia and the Colombian scientific community throughout the world. It was used by the Caldas Network as its Swiss node. Its main challenge is to transfer the enormous knowledge resources that its members have to the country of origin; but the question is how to do it since it does not have either the infrastructure to do it or the financial support. An Engineer and active member of ACIS told us: “*Without resources, ACIS is not able to present a solid plan; we do not even know who we should we present it to.*” Two (2) respondents and passive members of ACIS stressed the lack of flexibility and openness of the Association towards people from the private sector and other disciplines and fields beyond engineering.

“ACIS is very much centred around EPFL and particularly around Engineering at EPFL. It should be more global to include for instance Colombians from development studies in Geneva. ACIS lacks a link component. Many people here in banks or the private sector are hidden and remain unknown. ACIS should bring them together. Many people have good influences or high level positions that could create opportunities.”

*Electronics Engineer and Supply Chain Manager
Master in Logistics and Business Management*

Despite the obstacles and limitations that it has faced since its creation, the ACIS has served as a platform for the recognition of the potential of the Colombian scientific diaspora. Sixteen (16) of the twenty four (24) Colombians interviewed are members of the ACIS; four (4) of them are founder members.

Scientific diasporas and development of country of origin: which scientific policies and which development policies?

The perceptions that the Colombians had of their country of origin were focussed mainly on social problems, the economic progress of recent years and the political challenges.

Eight (8) of the people interviewed appreciate an improvement in the economic situation of Colombia. In this sense, macroeconomic stability, business dynamism, the growth in exports, the boom in the construction sector, the increase in direct foreign investment, the vitality of the markets, were some of the elements mentioned. However, the situation of inequality was a source of worry for the Colombians, since several of them mentioned the growing gap between rich and poor. One scientist, active in R&D, commented that *“the economic situation has many contrasts; for example I have observed a boom in computing and in the medical equipment available in some institutions in Colombia, but it is limited, and only available to the élite who have the resources, while the majority who are living in poverty have no access.”* Only two (2) Colombians are optimistic about the possibilities in the long run. One (1) Colombian was surprised at how a country with so many problems could be capable of reaching such a level of economic development.

With regard to the social panorama, the qualified Colombians interviewed were pessimistic and worried about a situation which they described as being *“difficult”, “problematic”, “serious” or “catastrophic”*, because of social polarisation, inequalities and the bad distribution of wealth, poverty, insecurity, instability and violence as well as the serious problem of the internally displaced. However two (2) Colombians made positive comments in this regard, mentioning the solidarity of individuals as well as the value of its human resources.

“Colombia is a country of great potential. Great human resources, hard workers, good education, universities, hospitals, good resources base, plenty of water and other natural resources, great food... all components for development. It just need better management.”

*Senior Programme Officer; Environmental Sciences
Master in Sciences*

With regard to the political environment, the Colombians perceive that Colombia is immersed in a politically unstable situation because of the armed conflict and the drug cartels. One teacher who was interviewed said that *“Drug money is buying everything: the institutions, justice, the police. If this problem persists we are not going to solve the problems of corruption, the lack of governability, social inequalities or poverty.”* With regard to the field of governability and the state of law, the Colombians interviewed believe that there is still a long road to be travelled as weak institutions, corruption and the lack of transparency, the restricted freedom of expression, the lack of a consensus between the government and the opposition, human rights abuses, are typical elements on the political scene.

The perception was that that Colombians are interested and informed about what is going on in their country of origin. In general they seem to be worried about Colombia's socio-economic and political situation. The effect that this could have on them is that their desire for security, stability and new opportunities to better themselves will have a greater influence on them than any considerations concerning a possible return to their homeland.

The interviews reveal some interesting facts on the matter of Colombian scientific policy and scientific and technological research. One scientist emphasised the excellence in some areas of research in Colombia, *“Colombia occupies third place in Latin America after Brazil and Chile, which are now at the vanguard in science and technology.”* The main worry is with the lack or insufficiency of institutional support and of resources for research and science. *“Scientific research is not a priority”* was a sentence repeated by many Colombian scientists.

The following stood out among the main challenges and proposals for a Colombian scientific policy mentioned by the interviewees: creation of a long-term scientific policy; the need for the private sector to show a greater compromise with science; the need to increase the focus on education in order to make it more accessible to the less favoured so that they can develop their own capacities; provide more resources to research in order to reach international levels; transparency in the handling and distribution of the funds and the institutions in charge of scientific policy; and the creation of evaluation committees

with members of the diaspora so that they can guide and advise the universities and the educational and research centres.

Finally, one of those interviewed highlighted the fact that there has been an increase in the number of doctorate students in Colombia in recent years. This is due to new opportunities to obtain research positions at universities as a result of the vacancies created by the retirement of some lecturers and also as a consequence of the fact that many researchers are leaving the country. We need to ask ourselves here if this situation is provoking an *optimal brain drain* effect, as explained by Lowell, Findlay and Stewart (2004).

On the other hand, the interviewees have a very positive perception of Swiss scientific policy, recognising that the investment in science is a priority and that the public resources for research are enormous, resulting in a high level of scientific productivity. Those interviewed also recognised that the considerable investment in science and technology and in R&D by the private sector in Switzerland is a positive element.

Half of those interviewed (12) considered Swiss co-operation policy towards Colombia as being insufficient. This is due to the fact that the established on the basis poverty criteria where Colombia is not included. In this context, one Colombian researcher pointed out that *“with a different orientation there would be greater possibilities for multiplying and increasing co-operation”*.

As far as Swiss migratory policy is concerned, the Colombians interviewed are worried by the migratory restrictions for Latin-Americans, by the three-circle policy, which is already limiting student permits even further. “Restrictive”, “tough”, “negative”, “exclusive” were some of the adjectives used to define this policy. One professional in a management position said that the *“Debates on migratory facts always focus on the negative aspects of migration. They show how many foreigners there are in the prisons, but they don't show how many there are in the universities”*. Six (6) of those interviewed mentioned Switzerland's mistakes as being: its failure to take advantage of qualified migrants who have spent some years in Switzerland and who are well integrated; not making a selection of immigrants in accordance with their capacities but rather according to their nationality; not facilitating their integration into the labour market; not introducing a skills-based points policy like in Canada. One researcher pointed out that *“Swiss institutions with an international projection such as the SDC should hire highly skilled migrants and not only Swiss people.”*

Conclusions and policy recommendations

The Colombian case study shows how the Colombian scientific diaspora in Switzerland has developed creative *brain gain* initiatives to benefit the country of origin. These initiatives have been based mainly on personal initiatives, and we have seen that cooperation at a scientist-scientist level has been a significant leverage for cooperation at university-university level. We have perceived that the Colombian scientific diaspora is very enthusiastic and motivated and that it possesses huge resources and capacities. Nevertheless, the human factor cannot do anything unless it receives the right support and long term support must come in a systematic manner from both sides - the country of residence and the country of origin.

“I do not believe that diasporas on their own can do much without the active participation of the government. Diasporas contribute with the human element “here” but the human element “there” is also imperative. A further required element is funding. Diasporas provide people but not funds. Up to now only one-off things have been achieved but there is no continuity (...) a sustainable strategy is missing. The diaspora is the initial point but it does not represent anything on its own.”

Professor and Dean of Faculty of Informatics and Communications

The country of residence should support the establishment of diasporas; Swiss policies should support them with coherent policies; Swiss migration policies should be selective, but they should consider skills and not nationalities and recruiting policies at high level academic and research institutions should be more flexible. Foreign students should be chosen on the basis of their excellence and prior collaboration at university-university level and not because of nationality. Swiss organizations should

support diaspora nodes and should incorporate diaspora members with experience in cooperation in order to enrich dialogue or public policies at their institutions. Cooperation research project possibilities should be supported on a regular basis.

The Colombian government must boost communication with the diaspora to keep abreast of different initiatives, provide financial and other types of resources, propose policies and new projects, involve the scientific diaspora in policy making by appointing them as scientific and professional advisors, and enhance collaboration with Swiss scientific and academic entities.

The existence of ACIS is a central element that should be exploited; sustained support from Colombian institutions would help reap maximum presence from it. The ACIS should be strengthened; it deserves an impulse based on institutional support from Swiss and Colombian entities and industry should also be involved. Financial support is an imperative. The integration of other social actors to the existing scientific diaspora networks is required. Thus, ACIS should expand its horizons to attract Colombian professionals and scientists from the fields of social and human sciences, management and administration, etc., thereby integrating Colombians occupying high level positions in different sectors as well as entrepreneurs, and it should also integrate highly skilled migrants from the German part of Switzerland.

The initiative for the creation of Virtual Labs as a permanent platform for knowledge circulation that enhances a science without borders is a creative idea that will be developed over the next few years. Once again, institutional structured support will be required for this initiative and financial support is also important while links with the private sector are a must.

Greater awareness of current initiatives and collaborations between Colombian diaspora and Colombians at home as well as between Colombia and Switzerland in the academic, professional, scientific and research-based spheres is essential. Increased dissemination of information on the content and skills of the Colombian diaspora in Switzerland is also necessary. The Forum for Cooperation Colombia-Switzerland that ACIS is planning to carry out next June, the inventory of projects that have been carried out with Colombia which the Colombian Embassy is preparing at the present and this research and action-oriented project are three examples of mechanisms that will increase information and knowledge about the Colombian scientific diaspora. The task then will be to disseminate the findings through the most pertinent channels. Dissemination of best practices will definitely help motivate diasporic initiatives even further.

5. Final Conclusions and Implications for Discussion

This short but intense first approach to the three scientific diaspora communities, Colombia, South Africa and India, has showed the potential of scientific diasporas to have an impact on the country of origin and the country of residence. We have performed an intense networking task that has helped us to identify a significant number of highly skilled migrants from the three countries of the case-study (Colombians and South Africans for the most part; a more intense strategy should be followed for Indians from now on). Diaspora members have shown a lot of enthusiasm and have made themselves readily available. Nevertheless, as we have already said, diasporas on their own and without the right support do not mean anything. Therefore, for this first phase, our intense networking has also included contacts with different key actors in an attempt to get them involved. These include embassies, Swiss institutions, industry, institutions from countries of origin, further diaspora initiatives and groups, as well as some key international organisations. The next important step is to establish stronger links with key institutions and persons in the countries of origin, as well as with experts and people from all fields, who are interested in these three countries, irrespective of their nationality. The possibility of South-South cooperation should also be taken into account.

An important question now is how to translate all these initial findings and recommendations on the usefulness, role and objectives of the diaspora network that this research and action-oriented project is creating. The main clues have been already revealed in these first in-depth interviews. The subsequent quantitative survey must then help us advance this research further.

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