

**“ Transnational practices to benefit local science and technology:  
Empirical evidence of the Colombian scientific diaspora “**

Dr. Gabriela Tejada  
École Polytechnique Fédérale de Lausanne  
gabriela.tejada@epfl.ch

**Abstract**

Within the current context of globalisation, transnationalism has acquired importance showing the value that the diasporas' own decentralized mechanisms have in promoting development in the countries of origin. In particular, scientific diasporas have the potential to benefit science and technology in their regions of origin in ways that go beyond the traditional institutional set-up. “Brain drain” and the growing world knowledge gap justify these innovative forms of knowledge transfer, carried out mainly through collective strategies of the new transitional identities of non-state actors.

The purpose of this paper is to show the innovative decentralised transnational practices of the Colombian scientific diaspora in Switzerland, which has managed to contribute to the advancement of development in Colombia. Colombia is a classic case of reference, having been the first country to put the idea of a “scientific diaspora option” into practice, through the creation of the Caldas Network. The technical and human structure that made the Caldas Network possible, celebrating its rise and then lamenting its fall, had its origins in Switzerland. Despite the lack of sustained support due to discrepancies in Colombia's science and technology policy, this structure continues to work in a dynamic way through associative actions. Nevertheless, we know very little about it.

The paper is based on the results of a major research project into skilled migrants from developing countries living in Switzerland carried out during 2006 and 2007 and it offers a diagnosis of the situation of the Colombian scientific diaspora in Switzerland and provides empirical evidence of its transnational practices, showing the value of its resources for promoting development and specifically Colombia's science and technology agenda. Precise transformations are revealed. These include the strengthening of specific research areas because of their contribution to the creation of a critical mass on issues such as the environment, ICT's and medicine, or influencing the design of science and technology policies.

Although affective capital and the ability to mobilise are traits of the Colombian scientific diaspora, the support of a consistent scientific policy is needed to capitalise on its resources. The conclusion is that attempts should be made to revert the tendency of the dynamic action of the Colombian scientific diaspora to advance faster than the local public policies which recognise and take advantage of it, by including it on the development agenda. The hope is that this would see its decentralized transnational activities, carried out in the interests of the development of Colombia, continue and expand over time.

**Keywords:** brain gain; skilled migration; migration and development; scientific diasporas; transnationalism; knowledge circulation; knowledge transfer; Colombian scientific diaspora.

## Introduction

Over the last few years, the expansion of globalisation has accelerated international migration flows, especially those of skilled individuals<sup>1</sup> (Adams, 2003), while there has also been an increase in the concerns about how to meet its challenges and in the strategies to take advantage of its potential benefits. While the contributions of skilled migrants in the host countries have always been evident, it is only recently that there has been a greater recognition that such migration may provide benefits to the South instead of definite losses and an acceptance that skilled migrants' transnational practices are significant resources for the development of their home countries. Many policy discussions and analyses have revolved around the ways to achieve such a brain gain with positive effects for the sending countries.

While the different dimensions of globalization allow migrants to construct new shared identities, leaving behind the monopoly of the identity edification by the nation-state (Castells, 1997), interesting specific initiatives have been carried out in recent years in an attempt to implement the *scientific diaspora option*<sup>2</sup>. This option aims at recuperating the skills of those who have emigrated and it seeks to integrate migrants' skills abroad into the scientific communities at home, by using different types of mechanisms based on transnational practices, often boosted by the created shared identities. Having recognised knowledge as a core catalyst for progress and the reduction of poverty (Tindemans, 2006) (UNESCO, 2006) and acknowledged human capital as a central factor of innovation and technology adoption (Docquier, 2007) (Tindemans, 2006), the necessity to explore the transnational practices of scientific diasporas as a policy option for advancing science and technology as well as socioeconomic development in the countries of origin, has become evident. Switzerland has traditionally been a major country of immigration, where the demand for skilled labour has shown a relative increase in recent years (IOM, 2005) (Pecoraro, 2004). This country is also an important destination for international students in advanced research programmes (OECD, 2007). However, the fact that the topic of skilled migrants from developing countries in Switzerland has not been fully addressed is somewhat paradoxical. There is no supporting evidence of scientific diasporas from developing countries, considering that one of the most significant initiatives that enabled the rise of the Colombian *scientific diaspora option* was initiated in Switzerland by Colombian skilled immigrants, and contributed to making it a reference case in general studies on scientific diasporas.

If we take the importance of today's migrant transnationalism into account and consider the lack of empirical evidence together with the obvious absence of a Swiss public debate on brain drain-brain gain, we see that the project "A Swiss Network of Scientific Diasporas to Enforce the Role of Highly Skilled Migrants as Partners in Development"<sup>3</sup> has tried to fill these gaps. By collecting data through field work in the countries of destination, the project offered knowledge-based evidence on the situation and conditions of skilled migrants from developing countries in Switzerland, their decentralized transnational practices and the function of brain gain mechanisms that could contribute to the reinforcement of science and technology in their homelands.

This paper presents some of the project findings and research results from the Colombian case-study, showing decentralized transnational initiatives and practices of the Colombian scientific diaspora in Switzerland which go beyond institutional and governmental structures, and it highlights the obstacles confronted as well as the positive elements that might enable an impact in the development of the country of origin. By analysing the Colombian case-study, the paper argues that globalization fosters the creation of transnational communities holding singular identities, which create a decentralized space for social participation where motivation as well as the ability of its members to mobilise supports their potential to have an impact in their homelands. However, they often find themselves in an environment in which they have to struggle to get some acknowledgement and institutional recognition. Some policy recommendations are given on how to engage with diasporas in order to enhance their decentralized practices and deepen their valuable resources through the appropriate supporting channels.

This paper is structured in four parts. The first part introduces transnational communities and diasporas in particular, as early steps in overtaking the nation-state in the current globalized world. The second part illustrates the value of scientific diasporas' resources pointing out their potential to impact development

---

<sup>1</sup> There are many definitions of skilled individuals. The most widely accepted description of the term *highly skilled* is that provided by the Canberra Manual developed by the OECD (1995), which considers them as human resources in science and technology covering scientists and professionals occupying high-level professional positions. When examining facts and trends of highly skilled migration, third level students are often taken into account because of their value as *semi-finished human capital* (Khadria, 2001).

<sup>2</sup> The scientific diaspora option refers to the theory explaining the social transnational phenomenon which implies the establishment of scientific diaspora networks (Charum and Meyer (coords.), 1998).

<sup>3</sup> The project "A Swiss Network of Scientific Diasporas to Enforce the Role of Highly Skilled Migrants as Partners in Development" funded by the Geneva International Academic Network (GIAN) ([www.ruig-gian.org](http://www.ruig-gian.org)) includes the first empirical research on highly skilled migrants from Colombia, India and South Africa living in Switzerland. More information at: <http://cooperation.epfl.ch/ScientificDiasporasNetwork/>

through knowledge and skills transfer and circulation and other collective recovery strategies. The third section accounts the experience of the Colombian scientific diaspora in the emergence of electronic networks and the establishment of the Caldas Network. The fourth part analyses the realities experienced by Colombian skilled migrants in Switzerland and their transnational practices and initiatives, emphasising motivation, the ability to mobilise, and an enabling environment and policies as three core factors that influence their possibilities to impact science and technology in their country of origin. The paper ends with a review of the main conclusions and recommendations.

### **Transnational identities and diasporas overtaking the nation-state**

Globalization has substantially modified the nature of contemporary nation-states as the main organisers of collective life and as bearers and creators of national identities (Castells, 1996). Challenged by the power of global networks together with the emergence of singular identities as defined by autonomous subjects (Castells, 1997), the modern nation-state seems to be losing control of the social practices and movements that go beyond borders. This process has stimulated the recognition of transnational communities and new social participation and mobility strategies through the deployment of migrants' resources, especially in international migration (Vertovec, 2004).

As an example of transnational communities, *diasporas* appear as significant precursors in the overtaking of the nation-state (Basch et al., 1994), designing an international deterritorialized space in which they operate in many formal and informal ways beyond the control of institutional structures.

The term *diaspora* (Cohen, 1997) is based on the inspiration of a transnational population, transnational community (Levitt, 1996) or community without borders (Basch et al., 1994), which has integrated into the country of residence, while maintaining and enhancing links with the country of origin, held together by factors such as a common ethnic identity and a collective relationship with the homeland (Fibbi and Meyer, 2002). Vertovec (1999) describes diasporas as a social entity shaped by a triadic relationship, made up of: globally dispersed yet collectively self-identified ethnic groups; the territorial states and contexts where such groups live; and the homeland states and environments where they or their families came from. For Cohen (1997), all diasporas share some key factors including: a forced or voluntary movement from the homeland to a foreign country or region together with a belief in the possibility of return; a shared memory about the homeland and a commitment to its preservation; a strong ethnic identity; more or less strained relations with the host country; the capacity to make valuable contributions to the country of residence and to the homeland; and a sense of community and solidarity with members of the same ethnic group also living where diaspora is located.

*Intellectual diaspora*, *skilled diaspora* or *knowledge diaspora* are all different expressions of the recent and widely used term *scientific diasporas*, which defines a self-organised community of immigrant scientists and engineers, living in developed countries and working to impact development in their country or region of origin, particularly in science, technology and education (Barre et al., 2003). Evidence of *scientific diasporas* and of *diaspora networks* (Barré et al., 2003) (Meyer, 2001) (Kuznetzov and Sabel, 2006) has been given, showing the significant value that diasporas have because of their transnational nature (Vertovec, 1999), and this has highlighted the necessary strategic links and other factors that are essential to recuperate the valuable resources of skilled individuals from developing countries who have settled outside their home countries, because of the limited availability of human capital in their homelands.

The exodus of skilled migrants from developing countries to industrialized countries poses a major dilemma. ILO data shows that developing countries suffer an average loss of between 10% and 30% of their scientists due to emigration to industrialized countries (Lowell and Findlay, 2002). These data are confirmed by other authors, and so one third of the South's scientists and engineers have expatriated to the North and are producing knowledge there. Similarly, it was estimated that the volume of skilled migrants living in OECD countries and whose origins are in third countries, increased by 8 million between 1990 and 2000, with the total topping 20 million at the end of the millennium (Katseli et al., 2006).

While skilled international migration is on the rise (Adams, 2003), migrants' transnational practices have acquired significant relevance in the last years. Coined in the early 1990s the concept of transnationalism encompasses the imagery of a permanent back-and-forth movement in which migrants exist at the same time in two or more societies and cultures, tying them together into deterritorialized communities (Basch et al., 1994). Transnational communities have a complex and hybrid form of identity. The dichotomous situation in which many migrants identify themselves in terms of at least a double identity, belonging to their country of origin and to that of residence –the repeated evocation of the *here* and the *there*–, helps us see the existence of a transnational population made up of foreign-born people whose regular daily activities are decentralised and conducted across national borders.

Since it is likely that transnationalism will become the predominant form of migrant belonging in the future (Portes, 2005) (Vertovec, 1999, 2004), its far-reaching consequences have to be faced, as transnational decentralized practices of skilled migrants from developing countries have the potential to positively impact science, technology and socioeconomic development in their home countries.

### **The scientific diaspora option**

The development impact of migrants' resources has received significant attention from both researchers and policy makers, especially since the 1990s, with diasporas being considered as a source of knowledge and skills circulating between countries. Notwithstanding the importance of human capital for endogenous economic development, recent global initiatives such as the Global Commission on International Migration, the 2006 UN High Level Dialogue on International Migration and Development and the 2007 Global Forum on International Migration and Development have highlighted the migration-development linkage, pointing out how feedback effects from skilled migration in the form of remittances, return and circular migration, the creation of business networks and further linkages can transform brain drain into brain gain. These feed-back effects are at the core of what has been called the *diaspora option* (Charum, 2001) (Meyer et al. 1997) (Tejada and Bolay, forthcoming) which aims at recovering the resources of the emigrated human capital.

Likewise, international organizations have made specific recommendations to developing countries to seize the potential of their diasporas (Ionescu, 2006) (IOM, 2005) (GCIM, 2005), and have shown evidence on how diaspora resources can benefit the sending countries through specific skills recuperation strategies. In fact, significant brain gain transnational practices have been launched with the support of traditional nation-state institutions. Particularly, since the early 1990s many scientific diaspora networks (Barré et al., 2003) (Kunestov and Sabel, 2006) have been created around the world as a response to the brain drain phenomenon and seek to mobilise skilled migrants and use their resources towards the development of their home countries by taking advantage of the advances in information and communication technologies. By using a networking approach, these initiatives use a decentred form of organisation and intervention and according to Castells (1997) they are examples of networking logic in the information society.

The scientific diaspora option is based in collective action. Indeed, many examples show how diverse diasporic groups have been established around a specific and common project. As Fibbi and Meyer argue (2002), a specific project might be the crystallizing element in the expression of the shared identity of a group, during the process of constructing a sense of community with members of the same ethnic group living where the specific diaspora is located (Cohen, 1997). In this sense, skilled migrants' organisations and networks combine their common *affective capital* towards the implementation of specific goals to benefit their country or region of origin. Scientific diaspora networks express the identity of skilled migrants building goals and projects around their own experiences and are specific examples of transnational action-oriented decentralized practices. As Waast (2003) argues, the scientific diaspora option is based on a double-folded assumption: that scientific human resources have become "floating resources", and that it is possible to search for different forms to territorialise their beneficial effects. Furthermore, Portes et al (2005) show empirical evidence of transnational activities linking expatriate communities to their countries of origin which stem from the initiatives of immigrants rather than governments, illustrating how the latter only intervenes when the significance and potential of migrants' cross-border practices become evident. It has been also pointed out that transnational activities are maintained thanks to the social resources of grassroots groups which compensate the scarcity of economic and political means (Vertovec, 2004) (Portes, 2005).

### **The Colombian scientific diaspora: a case in point**

Colombia was the first country to systematically put the idea of the *scientific diaspora option* into practice with the creation of electronic networks of scientists abroad (Meyer, 2001) (Barre et al., 2003). Indeed, for many years the Caldas Network was regarded as the most advanced version of this brain gain strategy and was followed by initiatives from other countries such as Argentina, Chile or Venezuela in Latin America, India and Korea in Asia or even South Africa in Sub-Saharan Africa.

The situation of science and technology policies in Colombia at the time the Caldas Network was created was a special one. Colciencias<sup>4</sup>, the Colombian Institute for the Development of Science and Technology, was created in 1968 as the entity in charge of S & T in the country. However, it was only at the end of the 1980s that the Colombian government began to recognise the importance of science and technology for socio-

---

<sup>4</sup> Colombian Institute for the Development of Science and Technology "Francisco José de Caldas", Colciencias.

economic development, and it formulated and implemented major policies in this area. At the end of the 1980s, the first PhD programmes were established, while scientific research was developed almost exclusively in the universities as a purely academic activity with only a few links to industry and other fields of social activity. At that time the lack of interest in building a long term national scientific policy together with the little importance that the government attached to science encouragement, showed that S&T was not a priority for Colombia. However, several dramatic social, political and economic changes took place at the beginning of the 1990s. These were caused mainly by the shift from a protectionist economic regime to a more open one. This time S&T was not left behind; the National System of Science and Technology was created and Colciencias acquired a central role as the entity responsible for organising all policy-implementation and fund-management activities. All these changes offset the lack of a cooperation tradition between scientific and technological sectors and contributed to the move towards more efficient forms of science practice, with the triple spiral university-state-industry (Waast, 2003) as the most significant model. Diverse sectors of the economy were exposed to international competition and a central concern was how to enhance their own competitiveness. Colombia, a country with a small, dispersed and mainly inward-oriented scientific community perceived a need to mobilise its external resources to develop the national scientific capacities. When the risk of scientists being isolated was highlighted, which was the norm among Colombian researchers, a link to the Colombian scientific community abroad was imminent.

Meyer (2001) mentions three conditions that were essential to make the Colombian scientific diaspora an option for enhancing science and technology in Colombia: 1) the emergency of electronic networks at the beginning of the 1990s; 2) the existence of skilled Colombian migrants around the world willing to contribute to the development of their homeland, guided by their motivation or affective capital; 3) a clear political signal of a coherent strategy offering skilled migrants the option to build the appropriate channels to make their desire to contribute a reality.

The emergence of electronic networks which supported skilled migrants' ability to mobilise as well as their motivation through their affective capital already existed and they inspired the subsequent idea of Colombian institutions to create a network of Colombian researchers abroad. While the suggestion originated in Colciencias circles, the Colombian scientific diaspora played the most significant role. In fact, the first use of the internet as a communication tool among Colombian researchers was for the creation of Colext at the CERN (European Organization for Nuclear Research) in 1990. This was a server list for Colombians abroad, created by a Colombian scientist<sup>5</sup>. Although it was not designed for scientific and technological communication but was intended more to enhance social exchanges, Colext ended up connecting academics mainly as only universities and academic centres were connected to electronic networks at that time. Following the initiative of their co-nationals in Switzerland, Colombian researchers around the world joined in and the list grew rapidly counting with a few hundred members the following year.

Colciencias took over the Colext structure to create the Caldas Network in 1992, with nodes in different countries. The main objective was to link Colombian scientists and researchers abroad with the local scientific community and national research programmes. Additionally, Colciencias increased the number of Colombian students abroad through the expansion of its graduate training programme<sup>6</sup>. The Colombian graduate students with grants together with other participants who were not supported by Colciencias but who were motivated by their enthusiasm to give something back to their homeland, became the backbone of the Caldas Network (Chaparro et al., 2006).

The Swiss node was one of the most active ones and established links with important Colombian universities. At one stage it included some of the most important Colombian researchers abroad, which shows its significance. The Swiss node of the Caldas Network functioned through the ACIS (Association of Colombian Researchers in Switzerland from its Spanish acronym). The creation of the ACIS was an original and recognised *brain gain* initiative of the Colombian scientific diaspora in Switzerland, as a scientific association set up to promote collaboration links between Colombian researchers in the homeland and the Colombian scientific community in Switzerland.

As Charum and Meyer (1998) explain, the official discourse was taken into consideration to launch the activities at the creation of the Caldas Network, but local strategies implemented by the members were the ones that articulated the complementary action of the different actors. In other words, the Caldas Network initiative of the Colombian government would never have been implemented without the motivation of the Colombian scientists and researchers abroad, their ability to mobilise or the infrastructure they created. Colombian institutions provided the enabling environment, while the motivation and the ability to mobilise,

---

<sup>5</sup> During a conversation with Fernando Rivera, he told us that, he started Colext to link up Colombian students abroad when he was a physics researcher at CERN, and it was then taken over by the government and became the Caldas Network. He pointed out: "*The network had momentum, but it did not receive long term governmental support*".

<sup>6</sup> During the period 1992-1997 Colciencias supported from 51 up to 176 graduate students abroad per year, gradually creating a community of almost 850 graduate students at the best universities in the world, the majority at doctoral level (Chaparro et al., 2006).

entrenched characteristics of the transnational identity of the Colombian scientific diaspora, were the elements that made the Colombian scientific diaspora option possible.

The main practical objective of the Caldas Network was to develop collaborative research projects between Colombian research groups and research groups in other world universities where Colombians were studying and/or doing research. Some examples of the collaborations carried out as well as an evaluation of the Network were published in two books (Charum and Meyer, 1998) (Charum et al., 1997)<sup>7</sup>. These publications showed the trajectories, characteristics and practices of the Colombian scientific diaspora for the first time. They also drafted a typology of the contributions of the Colombian scientific diaspora<sup>8</sup>. However, there is no register of the projects that were successfully formulated and implemented, and so we cannot determine the real impact of the Caldas Network in terms of the specific projects that were carried out.

After a dynamic launch supported by great enthusiasm and expectations, the Caldas Network lost momentum at the end of the 1990s, mainly because of a lack of financing for projects and the general science and technology crisis in the country. Colombia's insufficient institutional capacity to host the projects, resources and initiatives of its scientific diaspora hindered the potential impact of their transnational practices on endogenous socioeconomic development, and last but not least: it created many frustrations within the Colombian scientific diaspora.

## The Colombian scientific diaspora in Switzerland

### *Project background, case studies and methodology*

As Portes et al. (2005) point out, it should not be assumed *a priori* that all immigrants are transnationals or that they all carry out transnational activities. While the validation of transnationalism within immigrants is confirmed through empirical research, we can also verify the influence of transnationalism in migrants' dynamics as well as in public policies through empirical research. With this in mind, a completed research project, the first of its kind in Switzerland, aimed at uncovering the transnational practices of skilled migrants from developing countries living in industrialized countries.

The project "A Swiss Network of Scientific Diasporas to Enforce the Role of Highly Skilled Migrants as Partners in Development" developed by the EPFL during 2006 and 2007<sup>9</sup> aimed at providing a better understanding of the potential of skilled migrants from developing countries living in Switzerland to favor development in their countries of origin through *brain gain* mechanisms, social remittances (Levitt, 1996, 1999) and other scientific diasporas' decentralized transnational practices. The research carried out data analysis on a country-case specific basis towards the construction of three case studies, which traced skilled Colombians, South Africans and Indians in Switzerland.

These three case-study countries are good examples, because of the dynamism of their scientific and professional diasporas around the world and their significant *brain gain* experiences. Moreover, there is a high percentage of skilled people in the Swiss immigrant population from these countries<sup>10</sup>, and all three maintain ongoing scientific dialogue with Switzerland<sup>11</sup>. Switzerland, an increasing significant destination for skilled migration (IOM, 2005), is a country in which the immigration flows have evolved during the last years, shifting from a low-skilled labour force towards a highly skilled one (Pecoraro, 2004, 2005). This host country is also an important destination for international students (OECD, 2007), most of whom are enrolled on advanced research programmes<sup>12</sup>.

---

<sup>7</sup> Other publications on to the Caldas Network followed these two and showed details of the establishment, characteristics and achievements of the network (Meyer et al., 1997) (Granés, et al., 1998) (Barre et al., 2003) (Chaparro et al, 2006).

<sup>8</sup> The typology of the contributions include: design and implementation of public policies (some diaspora members were appointed by Colciencias to carry out evaluation and advisory tasks); training and education in science and technology (courses, students exchanges, etc.); communication and mobilization (information on scientific encounters, professional offers, scholarships and project funding possibilities); programmes and projects (Charum et al., 1997) (Charum and Meyer, 1998).

<sup>9</sup> The project was directed by the Cooperation@epfl unit at the EPFL and was carried out in collaboration with the International Labour Office (ILO), the University of Geneva (UNIGE), and the Swiss Forum of Migration and Population Studies (SFM), with financial support from the Geneva International Academic Network (GIAN).

<sup>10</sup> According to the Swiss Population Census Data 2000, 79.5% of Indian nationals, 73.1% of South Africans and 45.8% of Colombians in Switzerland are highly skilled. Migration from India and South Africa to Switzerland is becoming more qualified with time, given the fact that recent migration data shows that 83.6% of Indians and 78.7% of South Africans that arrived to Switzerland after 1995 are highly qualified. Recent migration from Colombia to Switzerland is getting less qualified with the time, since 41.3% of Colombian arriving after 1995 are highly skilled. However, in the Colombian case, the gender dimension is very significant as the share of women among highly skilled Colombians living in Switzerland shows an upward trend: 56.5% of highly skilled Colombians in Switzerland are women, while 63.3% of highly skilled Colombians arriving in Switzerland after 1995 are women. These data are indicative of the possible tendency at the end of the 20<sup>th</sup> century.

<sup>11</sup> Swiss scientific collaboration with India and South Africa is very advanced and is based on agreements between governments, while collaboration with Colombia is developed thanks to the engagement of Colombian scientists without any institutional or financial support.

<sup>12</sup> According to OECD data, international students in OECD countries are even more frequently enrolled in advanced research programmes than in regular university programmes. In Switzerland more than 40% of those on such programmes are international students, a high percentage only

The research put emphasis on the generation of primary data. Therefore, it included field work based on qualitative in-depth interviews intended to gain a better understanding of the perceptions, strategies and practices of skilled migrants in terms of the following: 1) migration trajectories and living conditions; 2) links with their home countries and *brain gain* mechanisms and strategies; 3) good scientific and development policies and practices to support skilled migrants as development partners.

Using the term highly skilled as defined by the Canberra Manual of the OECD (1995), the sample included human resources that have completed education at the tertiary level or which are employed in a science and technology occupation<sup>13</sup>. The number of respondents was fixed to 25-30 for each case study country. The strategy for selecting appropriate persons for the survey was based on networking schemes (mainly through interpersonal relations) as well as through the *snowball* principle. In total, seventy three (73) interviews were conducted with skilled migrants from Colombia, India and South Africa in Switzerland.

Specifically for the Colombian case study, twenty-seven (27) in-depth interviews were conducted (with 15 women and 12 men), in different Swiss cities, representing a cross-section including professionals in diverse sectors as well as PhD students and researchers in different disciplines and fields, from different socio-economic backgrounds, ages and gender. The sample included four categories of respondents: 1) scientists, post-doctoral researchers and PhD students at academic and research institutes; 2) staff working at international organisations; 3) managers and consultants working in private industry; 4) professionals in governmental institutions. Additionally, one respondent was out of the labour market at the time of the interview.

### *Causes and characteristics of Colombian high skilled migration to Switzerland and migrants life*

The first part of the interview provided testimony of skilled Colombians with regard to the causes and motivations for their migration, their migration paths and their living and working conditions in Switzerland. The determining factors and causes behind Colombian immigration in Switzerland can be summarised as follows: factor types 1) studies/training; 2) family regrouping / marriage; 3) professional and 4) socio-economic.<sup>14</sup> These factors often combine with the motivation to see/live other cultures. For all the determining factors, a combination of push and pull elements influenced the decisions to migrate.

Studies (postgraduate and PhD) and scientific training (post doctorate) represent the most important factor to explain the presence of qualified Colombians in Switzerland; while their presence is significant in the French part of Switzerland, it is not so great in the German speaking part. Most of the Colombians interviewed who came to study or train came to the Ecole Polytechnique Fédérale de Lausanne (EPFL) and to the University of Lausanne (UNIL). This is mainly due to the social networks developed over the past one or two decades<sup>15</sup>. 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*, and mentioned the lack of finance for knowledge activities, the shortage of materials and equipment, the lack of doctoral programmes in some fields, and the small number of research positions, indicating that the levels of scientific excellence as well as the resources and infrastructure available in Switzerland are better than they are in Colombia. Engineering, medicine and biochemistry are the training areas best represented by the Colombians interviewed.

For the OECD, student mobility offers a potential pool of qualified workers, whether during their study years or subsequently in the form of recruitment (OECD, 2007). This hypothesis of a transformation from migration for studies to migration for work applies repeatedly in the Colombian case: most of Colombians entered the labour market once they had completed their doctoral studies or training; some of them even start carrying out a lucrative activity during their studies<sup>16</sup>.

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 left for Switzerland, and there is a significant gender dimension behind the migratory patterns since, contrary to what is generally believed, many Colombian women who

---

comparable to that obtained in the United Kingdom (38.6%). Indeed, international students represented 12.7% of all third level education enrolments in Switzerland in 2004, while 42.5% of all persons in advanced research programmes were international students (OECD, 2007).

<sup>13</sup> Following the Canberra Manual (OECD, 1995) science and technology occupations comprise many diverse jobs (from managerial positions to specialists in their field of competences) and do not exclusively consider the scientific qualifications of human resources.

<sup>14</sup> It would be interesting to compare our results with those of the empirical study *Colombia Networks Survey* (Encuesta Redes Colombia) applied at the end of the 1990s to Colombians worldwide in research and academic centres. Those results showed that 75% of Colombians abroad had study and/or training as their main reason of departure while 10% left Colombia to work with an additional 15% citing other reasons for their departure (Charum and Meyer (coords.), 1998).

<sup>15</sup> The development and importance of the social networks for the Colombian scientific diaspora in Switzerland will be examined in greater detail in another section of this paper.

<sup>16</sup> This trend was already perceived in the late 1990s when *Colombia Networks Survey* (Encuesta Redes Colombia) showed that 50% of Colombians studying abroad were simultaneously involved in some lucrative activity (Charum and Meyer (coords.), 1998).

arrive in Switzerland for family regroupings or marriage are highly-qualified (Riaño, 2003). The respondents who gave family regroupings or marriage as their reason for departure were all women. Following their husbands to Switzerland as he pursued their scientific careers or married Swiss citizens, the so-called *love migration* (Riaño, 2003), was the main reason for their departure.

Labour mobility is the third factor in importance among highly qualified Colombians migrating to Switzerland, though it is not greatly represented. Labour mobility includes skilled professionals being relocated within multinationals, and it is facilitated by the network of professional and social contacts and scientific linkages which the Colombians had built up previously, and also due to family contacts in the country of destination. Finally, socio-economic reasons are also decisive factors in the migration process. In their search for better opportunities and professional prospects, most respondents recognised some important *pull factors* such as the opportunity for better jobs, or to follow a scientific and/or a professional career within excellent environments and conditions; as well as the quality of life, stability and security that Switzerland has to offer.

The survey shows that networks of professional and social contacts and scientific linkages can be decisive in the migration process. Respondents mentioned that some key members of the Colombian scientific diaspora, who are also ACIS founding members and who hold stable positions of a high academic level were their principal source of information on scholarship programmes or the possibilities of assistantships and exchanges. The interviews revealed that at least 20 PhD students have come to Switzerland during the last decade thanks to senior researchers and professors based either at the EPFL or at the UNIL, as a result of their individual efforts without a systematic institutional support.

Furthermore, some respondents mentioned bilateral cooperation, scholarship and scientific exchange programmes as being decisive factors in their decision to leave. One third of the respondents came to pursue their studies and research with the support of scholarships from Swiss or Colombian institutions mainly; while further respondents received a scholarship when they were already in Switzerland.

If we consider that international mobility is intrinsic to the scientific world and recognise that science benefits from the nomadism of scientists (Meyer et al., 2001), it is normal to perceive that skilled Colombian's migration paths include their stay in other countries before settling in Switzerland or abroad. A Colombian lecturer in computing at EPFL, who has lived in Switzerland for over thirty years, asserted: "*Exposure to the international arena is basic for scientific and personal advancement, as well as for the development of scientific capacities in Colombia*".

In this context, most Colombian immigrants interviewed spent time in other countries for educational and/or professional reasons before coming to Switzerland. Their different migratory routes include traditional destinations such as United States or United Kingdom as well as other European countries like: France, Germany, Spain and even Russia and other countries such as Israel or some Latin American countries like Brazil, Chile or Mexico. A few respondents said they returned to Colombia temporarily but came back later and re-established themselves in Switzerland (in some cases passing through a third country), especially to accept new professional or training opportunities which were better than those offered in their country of origin. Others mentioned the better quality of life in general as an additional element that motivated their return to Switzerland.

On the other hand, skilled migrants' paths and routes including the temporary return to the homeland show migration as a dynamic process in which international circulation provides experiences, language skills and multicultural work practice of significant value for the skilled human resources. Furthermore, the Colombian case study shows that in many cases, the personal agendas combine with professional goals giving as result a complex combination of causes behind skilled migration. It also shows that unlike unskilled workers, skilled migrants can move more easily and have more choices.

The interviews uncovered interesting information about how Colombian skilled lived their first experiences in Switzerland, as well as on the impacts of their integration in social and professional life in Switzerland. The analysis shows contrasting experiences among Colombians mainly related to their migration determinants. If we understand integration as having the same chances in training and professional life as local people, the Colombian case shows that skilled migrants supported by scholarships and work contracts generally have more positive first experiences in the host country and greater possibilities of integration than those who move for family regrouping/marriage or socio-economic reasons.

The class level of immigrants in the host society, which largely depends on migrants' economic as well as social and cultural capital (Bourdieu, 1986) may be decisive in their integration in the labor market as well as their possibilities to develop a scientific activity. The situation of Colombian skilled in Switzerland shows that institutionalized relationships, social contacts and scientific linkages –what Bourdieu (1986) refers to as *social capital*, are decisive in their integration in the host country. As Riaño and Baghdadi (2007) state, the associative actions of immigrants may play a decisive role in enabling integration, since they "have the

potential to sustain their access to social resources” (p. 167)<sup>17</sup>. As we will see later, integration in the host country provides Colombian skilled migrants with all the necessary perspectives to allow them to enhance their possibilities to carry out *giving back* practices in benefit of their countries of origin in the medium and long term.

Accordingly, respondents mentioned that ACIS’ collective action played a significant role in their provision of contacts, social and professional linkages and institutionalized relationships. Thus, for those that came through ACIS members or those who were supported by ACIS networking once here, their first experiences in the host country were encouraging. Further positive elements emphasised by skilled Colombians were: working in excellent scientific environments, the abundance of resources in the laboratory, their high level professional positions in the industry, the multicultural and international open professional environment, 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. A medical doctor, professor and researcher in immunology at the UNIL stated: “*My three-month research visit to Lausanne ended up with publications at the highest scientific level. I then had a choice between developing a scientific career here in an excellent academic environment with an outstanding quality of life, or going back to Colombia*”.

However, skilled Colombians also faced difficulties when they arrived in Switzerland. Those elements emphasized by respondents include: failure to have their Colombian academic qualifications recognised, the language barrier, adapting to a new culture and climate, adapting to a new rhythm and intensity of work, the difficulty to make friends and being far away from their families, and in some cases sexual or racial discrimination. As far as gender roles are concerned, especially in terms of combining one's private and professional lives, for most of the interviewed women who have children, balancing their responsibilities as mothers and as professionals or scientists in Switzerland represents a major challenge. They 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, and some of them were disappointed with the restricted number of places at day-care facilities. A women scientist and electronics engineer, who is a consultant in Lausanne, said: “*Switzerland lives in a big paradox since it is very developed in many issues but it is still very conservative in the society’s mentality towards working mothers because women are supposed to stay at home to take care of their children*”.

The migrant status of the respondents shows that skilled Colombians in Switzerland acquire a more stable migrant status over time, based mainly on their length of stay and attaining a stable job, which are both basic conditions for stability and thinking about mid to long-term perspectives. In this sense, while most were Colombian citizens when they arrived in Switzerland, with only one respondent having dual nationality, the migrant status of respondents changed during their stay in Switzerland, showing that one third of the Colombians have become naturalised Swiss. Moreover, most of the respondents hold a residence B permit, only a few hold a C permit, whereas one holds an L Permit.<sup>18</sup>

Finally, the interviews revealed that Colombians maintain contacts with other national communities, with the local community, as well as with the Colombian community, contributing to the strengthening of their social capital. Furthermore, the daily life endeavours of one third of respondents include regular exchanges with researchers and scientists in their country of origin. All of them belong to the category of scientists, post doc researchers and PhD students in research and academic institutions. The following section shows some of the most significant initiatives to benefit their home country as well as the strategies followed.

### *Brain gain mechanisms, social remittances and other transnational practices*

The project identified three brain gain mechanisms<sup>19</sup> which have a great potential to enforce science and technology, as well as socioeconomic development in the country of origin by encouraging the transfer of knowledge and other resources from the skilled persons abroad to their homeland: 1) scientific diaspora

---

<sup>17</sup> Riaño and Baghdadi (2007) address the question of the interaction of class, ethnicity and gender to understand the labor market participation of skilled immigrant women in Switzerland, showing the extent to which they are able to make use of their imported social and cultural capital to gain access to positions in the Swiss labor market according to their skills and experiences.

<sup>18</sup> The L Permit is a short-time residence permit, valid for a maximum of 18 months for further vocational educational or private activities; the B Permit is a year-round renewable residence permit given to qualified specialists and based on a federal quota system, permits with a maximum four-year span can also be granted; the C Permit is a permanent residence permit granted after a 5 or 10-year uninterrupted stay in Switzerland (depending on the country of origin). Those in possession of this permit have almost the same rights and opportunities as nationals.

<sup>19</sup> Previous to the execution of the field-work research, the project team identified these three brain gain mechanisms, based on the fact that in different country case examples, they have had a positive impact on development and poverty reduction in the countries of origin, through a systematic use of knowledge, experiences and resources (for example, through their participation in the creation of micro enterprises, employment generation, scientific and technical co-operation, implementation of community development projects, creation of scientific and technological centres, attraction of investment for research and experimental development, etc.).

networks<sup>20</sup> and associations; 2) investment strategies in research and experimental development (R&D)<sup>21</sup>; and 3) North-South scientific collaborations<sup>22</sup>. To identify the extent to which these mechanisms and other scientific diasporas' transnational decentralized practices and initiatives have been used and/or promoted by qualified Colombian in Switzerland, the interviews focussed on the relations between the migrants and their country of origin while also bearing in mind the professional contacts and exchanges of these migrants in Switzerland at an international level.

With regard to the first mechanism, we have highlighted Colombia as a case in point in the creation of scientific diaspora networks (Kuznetsov and Sabel, 2006) (Barré et al., 2003) thanks to the Caldas Network. Furthermore the ACIS (Association of Colombian Researchers in Switzerland) is a very significant example of a scientific diaspora association as some of its members have contributed to the strengthening the fields of environment, computing and medicine in Colombia, to name just a few, through the establishment of scientific collaborations that have endured over time despite being based on individual efforts without any institutional or financial support. The creators of the ACIS as well as other currently active members, who were among the Colombian respondents, recalled the objective of their association as being *“the promotion of the implementation of collaboration projects with Colombia”*. A Colombian respondent mentioned during the interview that: *“the value of the resources gathered in ACIS is a gold mine which Colombia has not appreciated”*. Moreover, the Colombian case study shows how scientific diaspora networks and associations play a very important role since they facilitate the implementation of the other two brain gain mechanisms: strategies for investment in R&D and North-South research collaborations.

On the one hand, as far as strategies of investment in research and experimental development (R&D) are concerned (Khadria, 1999, 2001) (Saxenian, 2000), the following initiatives have been carried out by Colombians: transfer of technology at an industrial-university level; research projects linked to industry; giving courses, conferences and advice to industry; advice for the creation and development of the internet in Colombia; direct assistance to PhD students in science and technology domains linked to industry, etc. On the other hand, the North-South research collaborations (KFPE, 2001) (Bolay, 2004) (Maselli et al., 2004) identified by the project, in which respondents were or had been involved, and which deserve mention include: the Cooperation programme in the environmental field between the EPFL, Univalle and other Colombian institutions; the cooperation project between the EPFL and the University of the Andes on environmental and air pollution financed by the Swiss Agency for Development and Cooperation (SDC); assistance to establishment an agreement between CERN and Latin America; the design and promotion of research collaboration on malaria between UNIL and Universidad del Valle; the design and promotion of the COCH project<sup>23</sup>, to name just some. Table 1 shows some good practices and initiatives involving the Colombian scientific diaspora.

*Table 1 : Good practices and initiatives involving the Colombian scientific diaspora*

<ul style="list-style-type: none"> <li>- Implementation of long lasting research in collaboration with institutions in countries of origin, boosting individual and institutional capacities through knowledge circulation, seminars, conferences and meetings, exchange of students and scholars, and joint publications, (i.e. biomedicine; agroecological modelling; environmental chemistry and biology).</li> <li>- Appointment of diaspora members as scientific advisors for public and private bodies, in both origin and destination countries (by the SER, Colciencias, embassies, etc.).</li> <li>- Creation of ACIS encouraging a bottom-up enhancement of scientific bilateral collaboration.</li> <li>- Implementation of research and scientific institutional programmes and agreements backing-up knowledge and scientists corridors (EPFL-SDC research fund, SNSF and ESKAS scholarships).</li> </ul>
---

<sup>20</sup> A further case in point of scientific diaspora networks is the South African network, SANSA (South African Network of Skills Abroad) (Brown et al, 1999) (Brown, 2003).

<sup>21</sup> The most well known example is that of highly skilled Indian expatriates, mainly those active in the information and communication technologies (ICT) sector, who during the 90's facilitated an estimated third of all the foreign investment in India, (Tarifica Ph. Ltd., 1998), creating a development model with potential to be replicated by other developing countries threatened by brain drain (Khadria, 1999, 2001) (Saxenian, 2000).

<sup>22</sup> North-South scientific collaborations encourage research between developing and developed countries, promoting temporary exchanges, joint publications and giving skilled migrants from the South access to the knowledge, infrastructure and equipment of the North. This mechanism permits the transfer of knowledge, skills and other social and cultural resources in both directions (North-South and South-North) and has the potential to act as a bridge for the circulation of these valuable resources to the mutual benefit of the North and the South. However, to ensure that North-South research partnerships will equally benefit both parts, a promotion of the recognition of mutual interests (Bolay, 2004), as well as an establishment of the partnership based on the needs and priorities of the South (KFPE, 2001) have been proved as necessary.

<sup>23</sup> The Colombia-Switzerland collaboration project on agro ecological models (COCH project) was signed in April 2005 by representatives of Colciencias and the Swiss State Secretariat for Education and Research (SER). It is the first bilateral collaboration project between both countries signed at a governmental level.

The interviews uncovered further Colombian skilled migrants initiatives and practices that could not neatly fit into any of the three brain gain mechanisms previously mentioned. Accordingly, respondents highlighted personally-motivated initiatives that can be labelled as social remittances (Levitt, 1996) (Nyberg-Sorensen, 2004), understood as practices, ideas, identities and social capital that migrants channel from the country of destination to the country of origin. The actions and practices of skilled Colombians involving a transfer of their knowledge and social capital to the homeland include: carrying out evaluations for Colciencias and 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 research or academic programmes or institutes; giving lectures and tutorials; carrying out research projects there; promoting student and researcher exchanges; participating in Conferences and Congresses; accepting advisory contracts with private firms; and providing research advice on an informal basis.

Although most of the Colombians interviewed do not follow specific 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 scientific associations are elements which have helped to push the initiatives forward.

The survey showed that most of the Colombians interviewed have or have had contacts and/or scientific and professional exchanges with their country of origin at different levels of intensity and in a variety of ways. Accordingly, one third of the respondents maintain scientific and/or professional exchanges on a permanent and systematic basis. However, there are a few that do not keep any contact or exchanges with their homeland on a scientific or professional basis mainly due to: lack of a network of scientific or professional contacts there; lack of interest from their Colombian counterparts; lack of motivation due to time constraints; 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 keep up permanent exchanges with the scientific community and professional organisations in Switzerland, Europe and worldwide. Accordingly, respondents are members of different professional, academic and scientific associations, consortiums, networks and societies in the fields and areas in which they are involved; Those worth mentioning include: physics, engineering, biology, medicine, immunology, neurosciences, chemistry, environmental engineering and chemistry, development studies, ICTs, mathematics, management and administration, geography, geology, and architecture<sup>24</sup>. Moreover, Colombian researchers and professionals are members of associations, regional and/or international scientific committees, advisors at research consortiums, and/or reviewers at scientific journals in some of the above mentioned disciplines and fields. All these contacts and activities indicate that Colombian skilled migrants have a broad-ranging set of interests and professional linkages to offer with the potential to influence their country of origin.

#### *Migrants' future plans and expectations: settlement, return or circulation*

The interviews bore in mind the migration future plans and expectations of skilled Colombian by asking them how they see themselves in ten years time in terms of their scientific and professional activities and their possible return to their homeland. Among the different answers, it was interesting to see that Colombians saw the links to their homeland as a central part of their future plans, although they do not seem to be sure if they will return to Colombia.

Scientific achievement and improving their scientific and academic positions were among the greatest hopes of the scientists and researchers in the sampling. Many of them mentioned that they would like to establish/increase their links with the country of origin and in this sense expect to establish specific projects with counterparts in Colombia in the future. Colombians stressed that a stable professional situation enables them to think about their future plans. Their future plans/expectations include the following: an evolution towards a higher participation in project management; directing a lab and research projects (with the country of origin, if possible); moving towards a more established and stable position; having more impact and recognition at international level. Moreover, some scientists and researchers mentioned their desire to link science with society and have plans to carry out activities which include a significant social component, if possible involving their country of origin. In these terms, respondents hope to be able to make a contribution to their countries of origin in both senses, scientifically and socially.

Professionals and staff in international organisations see themselves in a higher managerial position in the host country and linked to their country of origin somehow through projects in which they can apply their expertise back there. While respondents showed a willingness to develop professional and/or scientific activities in their

---

<sup>24</sup> It would be interesting to identify the extent to which these disciplines are represented in Colombian science and technology priorities as well as the socioeconomic agenda, in order to have an idea of the potential impact of the knowledge and skills transfer of the Colombian scientific diaspora.

countries of origin, in fact only a few Colombians see their future plans taking place back in Colombia. While these respondents dream of being able to go back to their homeland and apply there what they have learnt here or to have research projects managed here but implemented there, they do not seem to know for sure if they will certainly go back in the short-term and remain in Colombia on a permanent basis.

In fact, two thirds of the respondents 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. Behind the decision of returning lies the main worry of being unsure of the professional opportunities in the labour market in the home country, as well as the lack of possibilities to work in a good scientific environment with systematic support given by a long term science and technology strategy and policies. Only one of the Colombians interviewed intends to return in the short term.

The data gathered revealed how personal and family relations play an ever more important role as factors determining the causes for migration. And this illustrates again how a mixture of personal agendas and potential professional and training opportunities are behind the decision to migrate or return. Respondents with children at school age mentioned that education opportunities and an adequate environment for their children were behind their decision to settle definitively in Switzerland or to go back to Colombia. Finally, skilled migrants who will retire in the next few years plan either to go back to Colombia or to stay in Switzerland whilst being involved in “go and come back” scheme.

### *Factors boosting impact on the country of origin*

The Colombians were asked about their perceptions in terms of factors that enable or hinder their transnational initiatives to the benefit of their homeland., We have used the scheme proposed by Brinkerhoff (2006) to analyse their responses. Brinkerhoff points out three key factors which determine the extent of the contributions of diasporas to their countries of origin: 1) motivation; 2) ability to mobilize; 3) and an enabling environment and policies. An analysis of the information on the initiatives, experiences and strategies of Colombian respondents uncovered through the interviews helped us identify how and in which terms the three factors anticipated by Brinkerhoff influence their impact in their homeland.

Motivation (Esman, 1986) or *affective capital* (Tejada, 2007) (Tejada and Bolay, 2005) are entrenched characteristics of diasporas’ identity. Motivation is strong among skilled Colombians in Switzerland; the empirical evidence shows migrants’ deep desire to give back to and positively benefit their homelands. “*I would love to have an impact in my country of origin*” was a much repeated sentence during the interviews. Similarly, the Colombian scientific diaspora has shown its ability to mobilise. While the research identified some personal initiatives and strategies done on individual basis, the mobilization of the Colombian scientific diaspora resources in Switzerland has taken place mainly through group efforts, through their participation in ACIS. In fact, the majority of Colombian scientists and professionals share a common identity through their participation in ACIS. This group identity has contributed to the establishment, development and maintenance of the Association during the last 15 years. With the main challenge of transferring the enormous knowledge resources that its members have to the country of origin, ACIS has served up to now as a platform for the recognition of the potential of the Colombian scientific diaspora in Switzerland, and has had a key role in the contribution to the enforcement of science and technology in Colombia through collaboration projects, mainly at a scientist to scientist level, without any bilateral framework agreement or institutional support. In fact all their collaborations have been based on their personal inspiration and collective enthusiasm.

While two thirds of the respondents are member of the ACIS and four of them are founder members, a few respondents did not know about the existence of ACIS. These were mainly those from the German part of Switzerland. It is worth mentioning that despite the instability of its membership, ACIS has survived thanks to the support of some of the founding members who have stable high-level positions in research and academic institutions, and who continuously encourage its activities motivating the new generation of members.

While motivation and ability to mobilise are strong among skilled Colombians in Switzerland, it is the third criterion of Brinkerhoff scheme - the enabling environment and policies to boost the scientific diasporas’ resources in benefit of their homeland - which is lacking. The interviews uncovered the perceptions that skilled Colombians have of the enabling environment and policies to encourage their flow of resources and knowledge. With this in mind they were asked about their opinion regarding their country of origin focussing mainly on social problems, the economic progress of recent years and the political challenges.

Some 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 cited. Some respondents mentioned they were surprised at how a country with so many problems could be capable of reaching such a level of economic development. However, most respondents were worried about the social

situation in Colombia because of social polarisation, inequalities and the bad distribution of wealth, poverty, insecurity, instability and violence as well as the problem of the internally displaced. Only a few Colombians showed optimism about the long term possibilities. Some made positive comments about Colombian society, mentioning the solidarity of individuals as well as the value of its human resources.

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. With regard to the field of governance and the rule of law, they 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 the Colombians are interested and informed about what is going on back home. 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. 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; provide more resources to research; transparency in the handling and distribution of research funds; 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.

The Colombian case study reveals that adequate policies, institutional frameworks and infrastructure in the home country are necessary to mobilize diaspora resources. Indeed, countries of origin have to be provided with enabling conditions in order to retain their skills, capitalize on diasporas' resources, and encourage return migration (Gent and Black, 2005) (Cassarino, 2004) (Tani and Mahuteau, 2008) on an equal footing.

As far as return migration is concerned, there is broad agreement on the fact that homecoming needs to be sustainable (Black and Gent, 2004) (Gent and Black, 2005), meaning that returned migrants have to be provided with an enabling environment to ensure they stay long term. In fact, policies focusing on building high level educational institutions supported by a sustained coherent long term plan for science, technology and innovation, and economic development are the complementary factors for brain gain.

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 et al. (2004), which could be a positive element giving the fact that only 40 Colombians get a PhD's per year in the country<sup>25</sup>.

On the other hand, the interviewees have a 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. As far as Swiss migratory policy is concerned, the Colombians interviewed are worried by the migratory restrictions for Latin-Americans, which are already limiting student permits even further. "*Restrictive*", "*tough*", "*negative*" and "*exclusive*" were some of the adjectives used to define this policy. Respondents remark that Swiss migration debate always focus on the negative aspects of migration. In fact, a senior consultant in economics, working for an international organisation in Geneva highlighted: "*Swiss migration discourse shows how many foreigners there are in the prisons, but it doesn't show how many there are in the universities*".

## Conclusions

With a view to offering useful clues to help leverage the potentialities of skilled migrants from developing countries who are living in industrialized countries to impact development in their homeland, a major research project was carried out during 2006 and 2007 taking into account three case study countries: Colombia, India and South Africa, from the perspective of one country of destination: Switzerland.

Based on the project findings, this paper examines the situation of the Colombian scientific diaspora in Switzerland by providing empirical evidence on 27 Colombian highly skilled migrants, analysing their living conditions in the host country as well as the value of their transnational practices. While showing original

---

<sup>25</sup> This number was given to us by the Director of Colciencias, José Francisco Miranda, on his visit to EPFL on February 28, 2008.

ways in which Colombians live in the host countries whilst maintaining links with their homelands creating transnational subjects and distinctiveness beyond the traditional national identities, the paper gives evidence of the obstacles confronted and of the positive elements that might enable an impact of their brain gain practices, social remittances, and further transnational practices in the development of the country of origin.

The study builds on a brain gain approach, taking into account three mechanisms that have shown potential to contribute to the enforcement of science and technology: scientific diaspora networks and associations; strategies of investment in research and experimental development (R&D); and North-South research collaborations. The paper illustrates how the establishment of scientific diaspora networks and associations has played a significant role for the Colombians in Switzerland since it has encouraged the other two.

The empirical evidence shows that institutionalised relationships, social contacts and scientific linkages influence the class position of Colombian skilled immigrants in Switzerland, facilitating their integration in the labour market as well as in a scientific and/or academic activity. Additionally, this influence also becomes a migration determinant since the majority of Colombian scientists and professionals who come through scholarships, collaboration programmes or job offers have key informants, contacts and further linkages in the host country who have facilitated their move; and in general, they have more positive first experiences in the host countries than those Colombians who immigrate through familiar or socio economic reasons, without any previous contacts. Accordingly, the collective action of the Association of Colombian Researchers in Switzerland (ACIS) plays a significant role influencing class position, and as a platform to enhance collaboration among the Colombian diaspora and to strengthen scientific and technological capabilities in the country of origin.

The empirical data of Colombian scientific diaspora in Switzerland shows, as illustrated by Guarnizo et al. (2003) that transnationalism is not a phenomenon associated with recent arrival and destined to disappear as part of an unavoidable process of assimilation. The research uncovers a history of more than 20 years of collaboration experiences between Colombian scientists in Switzerland and their counterparts in the home country, with scant institutional and financial support; most of them based on personal initiatives, interests and strategies by members of the diaspora that have been in Switzerland for many years holding stable positions in scientific and academic top institutions, brought together in ACIS by their sense of community. In particular, the research reveals the great value of the individual capacities and strengths of Colombian scientists in the fields of ICTs, medicine and the environment, which have boosted further individual capacities in both Colombia and Switzerland, which are all necessary for the construction of institutional capacity.

The long experience of ACIS reveals the lasting motivation and endurance of the Colombian scientific diaspora in Switzerland<sup>26</sup>. In fact, while motivation and the ability to mobilise are traits of the Colombian scientific diaspora, the support of a consistent scientific policy in the homeland, as well as a higher scientific recognition in Switzerland which might encourage the appropriate institutional framework for bilateral scientific collaboration, are needed to capitalise on its resources.

As pointed out by one of the Colombian participants in our survey, the Professor and Dean of the Faculty of Computing and Communications in Switzerland: *“Diasporas on their own cannot do much without the active participation of governments. 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 bilateral strategy is missing. The diaspora is the initial point but it does not represent anything on its own.”*

These conclusions have important implications for public policies in both the country of destiny and the country of origin. Firstly, only an adequate environment in the home country will enable the engagement of diasporas in the advancement of endogenous socio-economic development, encourage return and permit the retention of its skilled individuals<sup>27</sup>. Secondly, a top-down institutional support from Swiss policies should respond to the systematic excellent bilateral scientific collaborations conducted by Colombian scientific diaspora members, as it has been done with regard to other countries<sup>28</sup>. Thirdly, in a country like Switzerland

---

<sup>26</sup> At the forum on scientific cooperation between Colombia and Switzerland, organized by ACIS on June, 2007, one of the key members of the Colombian scientific diaspora, gave evidence of his record of collaborations with Colombia and the lack of institutional support, on his presentation: “Memories of a combatant”.

<sup>27</sup> A new project proposal that has recently been prepared by Cooperation@epfl aims at building on our results from the perspective of the countries of origin (India, Colombia and South Africa). The new project seeks to advance the hypothesis that retrieving the value and resources of skilled migrants physically or virtually, and enhancing the capacities and infrastructure available at home to reinforce and retain the skills are complementary dimensions within a comprehensive approach to brain gain in developing countries.

<sup>28</sup> For example, with regard to Swiss bilateral scientific collaboration with the other case study countries of our project, India and South Africa, it is worth mentioning that both have an institutional framework supporting science and technology exchanges, given the fact that both are priority countries of the current bilateral cooperation strategy of the Swiss State Secretariat for Education and Research. Various instruments of the institutional framework guide and promote scientific and technological cooperation at university-university level as well as at scientist-scientist level. At the other extreme, there is no institutional framework for scientific collaboration between Switzerland and Colombia despite the fact that many collaborations have been systematically established on a bottom-up basis over the past two decades: at university-university and scientist-scientist levels. Most of

with restrictive immigration policies to the detriment of migrants from developing countries, where cooperation with developing countries carries no prestige, and where there is still a lack of recognition of the value and potential of Colombian scientists in academic and research institutions, increased dissemination of information on the position, activities and skills of the Colombian scientific diaspora in Switzerland is necessary to show its value and potentialities. Fourthly, 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. Fifthly, the existence of ACIS is a central element that should be exploited; while sustained support from Colombian institutions would help reap maximum benefit from it, ACIS should continuously disseminate good practices to help motivate diasporic initiatives even further.

Finally, as far as further results and findings of the research project are concerned, the project contributed to the policy dialogue on migration and development and scientific cooperation policies through the organization of two workshops to define policy recommendations and implications, and it produced an action oriented tool kit with good practices of skilled migrants and scientific diasporas as a guide for promoting brain gain. Additionally, the project created the Swiss Network of Scientific Diasporas ([www.snsd.ch](http://www.snsd.ch)) for the promotion of cooperation and knowledge circulation using a development impact approach. The project team is preparing a book with the results of the research to show the evidence on skilled migration from developing countries, based on the perspective of the destination country (Tejada and Bolay (eds.), forthcoming) which will provide an interesting overview of skilled migrants from developing countries in the Swiss labour market and will offer a reflection on the links between diasporas, science and development following a philosophical and political theory approach. This will complement all those aspects with policy recommendations and strategies for the capitalization of the potential of transnational communities at an international level within the migration-development nexus. At a later phase, the project aims to build on our results from the perspective of the countries of origin.

## References

- Adams, Richard (2003) "International migration, remittances and the brain drain: A study of 24 labor-exporting countries", World Bank Policy Research Working Paper 3069 [Available at: <http://www2.gtz.de/migration-and-development/download/adams.pdf>]
- Barré, Remi (et al.) (2003) *Diasporas scientifiques. ¿Comment les pays en développement peuvent-ils tirer parti de leurs chercheurs et de leurs ingénieurs expatriés?*; Institute de Recherche pour le Développement ; IRD éditions ; Paris.
- Basch, Linda (et al.) (1994) *Nations unbound: transnational projects, postcolonial predicaments and deterritorialized nation-states*; Gordon and Breach; Langhorne.
- Black, Richard and Saskia Gent (2004) 'Defining, measuring and influencing sustainable return: The case of the Balkans'; Development Research Centre on Migration, Globalisation and Poverty Working Paper, T7, University of Sussex, Brighton [Available at: [http://www.migrationdrc.org/publications/working\\_papers/WP-T7.pdf](http://www.migrationdrc.org/publications/working_papers/WP-T7.pdf)]
- Bolay Jean-Claude (2004) "World globalisation, sustainable development and scientific cooperation", in *International Journal of Sustainable Development*; volume 7- 2004; Wolverson Mill; UK.
- Bourdieu, Pierre (1986) "The forms of capital"; in John G. Richardson (ed.), *Handbook of theory and research for the sociology of education*; Greenwood Press; New York; pp. 241-258
- Brinkerhoff, Jennifer (2006) "Diasporas, skills transfer and remittances: evolving perceptions and potential"; in Wescott and Brinkerhoff (eds.); *Converting migration drains into gains: harnessing the resources of overseas professionals*; Asian Development Bank; Manila; pp. 1-32.
- Brown, Mercy (2003) "The South African Network of Skills Abroad: The South African experience of scientific diaspora networks"; in Barré et al. (2003); *Scientific diasporas*; IRD; Paris.
- Brown, Mercy (et al.) (1999) "SANSAs: A promising linkage with the diaspora" [Available at: <http://sansa.nrf.ac.za/documents/grad99.pdf>].
- Cassarino, Jean-Pierre (2004) "Theorising return migration: The conceptual approach to return migrants revisited"; *International Journal on Multicultural Societies*; Vol. 6; No. 2; 2004, pp. 253-279 [Available at: <http://unesdoc.unesco.org/images/0013/001385/138592E.pdf#page=60>]

---

these have been promoted by members of the Colombian scientific diaspora. Since collaborations without institutional support are fragile, it is time for the Swiss scientific policies to respond.

- Castells, Manuel (1996) *The rise of the network society*; The information age: economy, society and culture; Volume I; Blackwell.
- Castells, Manuel (1997) *The power of identity*; The information age: economy, society and culture; Volume II; Blackwell.
- Chaparro, Fernando (et al.) (2006) "Promise and frustration of diaspora networks: Lessons from the Network of Colombian Researchers Abroad; in *Diaspora networks and the international migration of skills*; World Bank Institute; WBI Development Studies; Washington DC.
- Charum, Jorge (2001) "La opción diáspora científica. Una nueva posibilidad de recuperación de las capacidades emigradas", *Colombia Ciencia y Tecnología*; Vol. 19; No. 002; Bogota; pp. 12-18.
- Charum, Jorge (et al.) (1997) *El brain drain revisited a través del caso colombiano. Estudio de la Red Caldas*, Universidad Nacional de Colombia; Bogota.
- Charum, Jorge and Jean-Baptiste Meyer (coords.) (1998) *Hacer ciencia en un mundo globalizado. La diáspora científica colombiana en perspectiva*, Colciencias, Universidad Nacional, Tercer Mundo, Bogota.
- Cohen, Robin (1997) *Global diasporas: an introduction*; UCL Press; London.
- Docquier, Frédéric (2007) "Brain drain and inequality across nations"; *Migration and development: Mutual benefits?*; Proceedings of the 4<sup>th</sup> AFD-EUDN Conference, 2006; Paris; Agence Française de Développement.
- Esman, Milton J. (1986) "Diasporas and International Relations"; in Sheffer Gabriel (ed.) *Modern diasporas in international politics*; Croom Helm; London; pp. 333-349.
- Fibbi, Rosita and Jean-Baptiste Meyer (2002). "Introduction: le lien plus que l'essence." *Autrepart Numéro thématique: Diasporas, développements et mondialisations*: 5-21.
- GCIM (Global Commission on International Migration) (2005) *Migration in an interconnected world: New directions for action. Report of the Global Commission on International Migration* [Available at: <http://www.gcim.org/attachements/gcim-complete-report-2005.pdf>]
- Gent, Saskia and Richard Black (2005) "Defining, measuring and influencing sustainable return"; Development Research Centre on Migration, Globalisation and Poverty; Policy Briefing Nr. 3; University of Sussex, Brighton [Available at: [http://www.migrationdrc.org/publications/briefing\\_papers/BP3.pdf](http://www.migrationdrc.org/publications/briefing_papers/BP3.pdf)]
- Ghosh, Bimal (ed.) (2000) *Return migration. Journey of hope or despair?*; IOM; Geneva.
- Guarnizo (et al.) (2003) "Assimilation and transnationalism: determinants of transnational political action among contemporary migrants", *American Journal of Sociology* 108; No. 6; Chicago University Press; 1211-1248
- IOM (International Organization for Migration) (2005) *World migration 2005. Costs and benefits of international migration*, Volume 3, IOM World Migration Report Series.
- Ionescu, Dina (2006), *Engaging diásporas as development partners for home and destination countries: challenges for policymakers*; Migration Research Series, No. 26; Geneva; International Organisation for Migration.
- Katseli, Louka (et al.) (2006) "Effects on migration on sending countries: What do we know?"; Working Paper No. 250; OECD Development Centre; June 2006.
- KFPE (Swiss Commission for Research Partnerships with Developing Countries) (2001) *Enhancing research capacity in developing and transition countries*; Swiss Commission for Research Partnership with Developing Countries; Bern; Geographica Bernensia.
- Khadria, Binod (1999) *The migration of knowledge workers: second generation effects of India's brain drain*, Sage Publications, New Delhi.
- Khadria, Binod (2001) "Shifting paradigms of globalization: The Twenty-first Century transition towards generics in skilled migration from India"; *International Migration*; Vol. 39; No. 5; Oxford; Blackwell; pp. 45-71.
- Kuznetsov, Yevgeny and Charles Sabel (2006); "International migration of talent, diaspora networks, and development: overview of main issues"; in Kuznetsov (ed.); *Diaspora networks and the international migration of skills. How countries can draw on their talent abroad*; World Bank Institute; Washington.
- Levitt, Peggy (1996) "Social remittances: A conceptual tool for understanding migration and development"; Working Paper Series 96-04; Harvard; Cambridge.
- Levitt, Peggy (1999) "Social remittances: a local-level, migration-driven form of cultural diffusion"; *International Migration Review*; No. 32(124); pp. 926-49.

- Lowell, B. Lindsay and Allan Findlay (2002) "Migration of highly skilled persons from developing countries: impact and policy responses"; *International Migration Papers* 44; ILO; Geneva [Available at: <http://www.ilo.org/public/english/protection/migrant/download/imp/imp44.pdf>]
- Lowell, B. Lindsay (et al.) (2004) "Brain strain. Optimising highly skilled migration from developing countries"; *Asylum and Migration Working Paper* 3; Institute for Public Policy Research; London.
- Maselli Daniel (et al.) (2004), *Improving impacts of research partnerships*, KFPE, Bern.
- Meyer, Jean-Baptiste (2001) "Network approach versus brain drain: lessons from the diaspora", *International Migration*, Vol. 39, No. 5, Blackwell, Oxford, pp. 91-110.
- Meyer, Jean-Baptiste (et al.) (1997) "Turning brain drain into brain gain: the Colombian experience of the diaspora option"; *Science, Technology and Society*; 2(2), pp. 285-315.
- Meyer, Jean-Baptiste (et al.) (2001) "Scientific nomadism and the new geopolitics of knowledge", *International Social Sciences Journal*; No. 168.
- Nyberg-Sorensen, Ninna (2004) "The development dimension of migrant remittances"; *Migration Policy Research Working Paper Series*, 1 [Available at: <http://www.iom.int/DOCUMENTS/PUBLICATION/EN/mpr1.pdf>]
- OECD (Organisation for Economic Cooperation and Development) (1995) "The measurement of scientific and technological activities. Manual on the measurement of human resources devoted to S&T, Canberra Manual [Available at: <http://www.oecd.org/dataoecd/34/0/2096025.pdf>]
- OECD (Organisation for Economic Cooperation and Development) (2007) *International Migration Outlook: SOPEMI 2007*; Annual Report 2007.
- Pecoraro, Marco (2004) "Highly skilled migrants in Switzerland"; Swiss Forum for Migration and Population Studies; University of Neuchâtel; [Available at: [http://www.irpps.cnr.it/ricmob/web\\_conf/download/Pecoraro\\_paper.pdf](http://www.irpps.cnr.it/ricmob/web_conf/download/Pecoraro_paper.pdf)]
- Pecoraro, Marco (2005), "Les migrants hautement qualifiés", *Migrants et marché du travail en Suisse*; Swiss Federal Statistical Office; Neuchâtel; pp. 71-109
- Portes, Alejandro (2005) "Convergencias teóricas y evidencias empíricas en el estudio del transnacionalismo de los inmigrantes"; *Migración y Desarrollo*; pp. 2-19
- Portes, Alejandro et al. (2005) "Immigrant transnational organisations and development: a comparative study"; Centre for Migration and Development; Working Paper Series; Princeton University; CMD Working Paper #05-07
- Riaño, Yvonne (2003) "Migration of skilled Latin American women to Switzerland and their struggle for integration", YAMADA Mutsuo (ed), *Emigración Latinoamericana: Comparación Interregional entre América del Norte, Europa y Japón*, Population Movement in the Modern World VII. JCAS Symposium Series 19, The Japan Centre for Area Studies, National Museum of Ethnology, Osaka.
- Riaño, Yvonne and Nadia Baghdadi (2007) "Understanding the labour market participation of skilled immigrant women in Switzerland: The interplay of class, ethnicity and gender"; *Journal of International Migration and Integration*; Vol. 8; No. 2; Springer Netherlands; pp. 163-183
- Saxenian, Anna Lee (2000) "The Bangalore boom: from brain drain to brain circulation?", en Kenneth Kenniston and Deepak Kumar, eds.; *Bridging the Digital Divide: Lessons from India*; National Institute of Advanced Study; Bangalore.
- Tani, Massimiliano and Stéphane Mahuteau (2008) "Return migration and working choices"; MIREM Project; European University Institute, Florence; Robert Schuman Centre for Advanced Studies; Analytical report MIREM – AR- 2008-1 [Available at: [http://www.eui.eu/RSCAS/e-texts/MIREM\\_AR\\_2008\\_01.pdf](http://www.eui.eu/RSCAS/e-texts/MIREM_AR_2008_01.pdf)]
- Tarifica Phillips Ltd. (1998) "Influjo del entorno cambiante de las Telecomunicaciones internacionales en la India", Estudio de caso preparado para la UIT para el Segundo Foro Mundial de Política de las Telecomunicaciones [Disponible en: [http://www.itu.int/osg/spu/wtpf/wtpf98/cases/Final/india\\_s.pdf](http://www.itu.int/osg/spu/wtpf/wtpf98/cases/Final/india_s.pdf)]
- Tejada, Gabriela (2007) *Diasporas científicas: una oportunidad para impulsar el desarrollo de México*; Serie Migración: causas, consecuencias y recomendaciones; No. 1; Programa de Asuntos Migratorios; Universidad Iberoamericana; Mexico.
- Tejada, Gabriela and Jean-Claude Bolay (eds.) (forthcoming) *Scientific diasporas and highly skilled migrants from developing countries in Switzerland: empirical evidence and policy responses*; Results and findings of the project "A Swiss Network of Scientific Diasporas to Enforce the Role of Highly Skilled Migrants as Partners in Development", funded by the GIAN.
- Tejada, Gabriela and Jean-Claude Bolay (2005) "Enhancing development through knowledge circulation: A different view of the migration of highly skilled Mexicans"; *Global Migration Perspectives* No. 51; Global Commission on International Migration. [Available at: <http://www.gcim.org/mm/File/GMP%2051%20english.pdf>]

Tindemans, Peter (2006) “Produire le savoir et en tirer profit: les nouvelles règles du jeu”; *Rapport de l'UNESCO sur la science* ; Paris; Ed. UNESCO; pp. 1-25.

UNESCO (2006), *Rapport de l'UNESCO sur la science* ; Paris; Ed. UNESCO. [Available at [http://www.unesco.org/science/psd/publications/rapport\\_science.pdf](http://www.unesco.org/science/psd/publications/rapport_science.pdf)].

Vertovec, Steven (1999) “Conceiving and researching transnationalism”; *Ethnic and Racial Studies*; 22 (2); pp. 447-462 [Available at: <http://www.transcomm.ox.ac.uk/working%20papers/conceiving.PDF>]

Vertovec, Steven (2004) “Migrant transnationalism and modes of transformation”; *The International Migration Review*; Fall 2004; Vol. 38; Nr. 3; pp. 970-1001.

Waast Roland (2003) “Diasporas en contexte” ; in Barré et al. (2003) *Diasporas scientifiques. ¿Comment les pays en développement peuvent-ils tirer parti de leurs chercheurs et de leurs ingénieurs expatriés?*; Institute de Recherche pour le Développement ; IRD éditions ; Paris.