



ERAWATCH COUNTRY REPORTS 2012: Algeria

ERAWATCH Network

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Executive Summary

Algeria (the People's Democratic Republic of Algeria) is the largest country on the African continent. Algeria is neighbouring with Morocco, Western Sahara and Mauritania (to the west), Mali and Niger (to the south) and, Libya and Tunisia (to the east). Increased regional instability and the continued (2011-2013) political and security deterioration in Algeria's neighbouring countries has a direct impact on internal policy priorities. Algeria's sheer size makes it the de-facto regional security guarantor. This responsibility absorbs significant funding from the Algerian national budget, and it comes to no surprise that Algeria's national defence budget remained second to none in the region.

Algeria's area (2.4 million square kilometres) accounts for 7% of the African continent. Algeria's population was last reported at 38.48 million inhabitants – estimate from December 2012 (~4% of the African population). Algeria's population density stands at 15 inhabitants per sq.km; however this number can be misleading and should be corrected for regional geographic particularities. Geographically, Algeria could be divided into 5 regions, each with its specific economic and cultural characteristics and needs;

1) North Central (Region around the Capital City of Algiers) is highly populated and developed; it is home to all central government institutions and benefits from the bulk of national structural investments;

2) North Eastern region (around the historic city of Constantine), a highly mountainous region, transforming rapidly due to increased industrial and commercial investments (mostly private). Dijet, Skikda, Setif, Bordj Bou Arreridj, and Annaba are at the forefront of this investment activity.

3) North Western region (around the port city of Oran) has maintained its agricultural nature due to the high fertility of its land and its intense agricultural activity dating from the French occupation.

4) The Highlands are limited by the Atlas Mountains and represent a natural barrier between the fertile north and the arid Sahara desert. This semi-arid region, from the Tunisian border to the Moroccan border, thrives on livestock commercial activities.

5) The Southern region or the Sahara desert is sparsely populated (less than 2 inhabitant per sq.km). The southern region is home to some agricultural activity (palm trees mostly) and to Algeria's entire oil and gas production and transport infrastructure.

This regional differentiation has become (since 2011) an important factor in determining ongoing and planned higher education and scientific research infrastructure investment and future developmental plans. Planned infrastructure put forth by the Ministry for Higher Education and Scientific Research (MHESR) and the Directorate General for Scientific Research and Technology Development (DGSRTD) takes into account these regional specificities and translates a genuine interest in an all-inclusive, nationwide, higher education and scientific research infrastructure. The DGSRTD no longer dictates and/or imposes research infrastructures on the different regions, but rather requests that each region or sub-region proposes an infrastructure which best fits its needs, based on existing human capital and, economic and cultural needs. This has led to the emergence of poles of excellence.

2011 saw the completion of the East-West highway. This €15b (1,500b DZD) project has greatly reduced travel times between cities as far apart as Tlemcen (Moroccan border) and Annaba (Tunisian border). This highway provides for a quick and efficient way to move around all northern parts of the country. Plans for a second east-west highway are in progress for the highlands region and, the Algiers-Tamanrasset, north-south motorway has been greatly improved (plans to upgrade it to a highway are also in the works). Heavy investment in road and railway infrastructure and services has greatly improved the scientific collaboration between universities and research centres from different regions of the country. Participation in national conferences is more representative of the national research fabric and attendance to planning meetings in Algiers is on the rise.

Algeria's culture is a mix of the Mediterranean, Arab and African cultures. Historical ties with France (the former colonial power) make of Algeria the largest and second most populous French speaking country. These historical ties have profound effects on the Algerian education system and more specifically on the Algerian higher education and scientific research modus operandi. French remains the preferred higher education and scientific research language and international collaborations are strongest with French institutions. The predominance of the French language within the Algerian scientific community is a major barrier to partnership diversification and participation in international programmes using English as the language of communication, including EU research initiatives.

Algeria's economy remains greatly dominated by the state. 2012 put a stop to all privatisation efforts engaged in previous years. Privatisation of large industrial complexes has been halted and new laws have been enacted to limit foreign ownership of large businesses to 49%. This is due to two essential reasons 1) failure of foreign investors to respect their previous commitments in terms of transfer of technology and follow up investment in R&D infrastructures and initiatives and, 2) civil tension resulting from increased unemployment and the view held by many Algerians who consider existing foreign investments/projects/industries as pure distribution channels to lesser quality products, with minimal incidence on local job creation. As a result of this civil "tension" the Algerian government agreed to salary increases for all public servants. In this context the government continues to enforce public spending policies aimed at increasing cash flow among the population. During the past 6 years, public spending has increased an average of 27% per annum. The different public spending policies have allowed public budget deficit to remain relatively high at around 2% of GDP (from the 1% deficit in 2010 and a 9.1% surplus in 2008). This fact partly explains the loss of value of the Algerian currency on the international exchange market. Pegged to the Dollar, the Algerian Dinar (DZD) lost more than 10% of its value (against the US Dollar) during 2011 (it remained somewhat stable during 2012 mainly due to controlled import activities). Inflation has also been on the rise, from 4.64% (2011) to close to 5% (2012). Despite these reports, the Algerian economy remains relatively stable. The GDP has expanded by close to 2% during 2012. While the balance of trade has remained positive during 2012 (€16b (1,600b DZD)) est. 2012 from €8b (800b DZD) est. 2010), it is expected to end 2013 on a negative outlook. Gold and foreign currency reserves grew to more than €160b (16,000b DZD) (not taking into account the sizable reserves kept in the hydrocarbon revenue stabilisation fund). This financial cushion has allowed Algeria to stay on track with its heavy structural investment plans without resorting to foreign debt. The status of foreign debt remains unchanged from the previous year (€4b (400b DZD) Financial Year (FY) ending 2012 -2% of GDP- compared to €3.64b (364b DZD) FY ending 2010 -3% of GDP-).

For 2012, the most current data puts the GERD to GDP at 0.27% (Unchanged from previous years). Public financing remains the predominant contributor to the GERD. Valuation of business enterprise contribution to R&D is still difficult to achieve (best estimates put the BERD at less than 0.1% of GDP). Research is predominantly achieved by university laboratories, closely followed by public research centres. The private pharmaceutical industry sector is maintaining a proactive posture towards R&D activities and the energy sector (public and private) is closely following on its lead.

While R&D activities remain weak, sustainable progress is being achieved. For example, the Ministry of Posts, Telecommunication and Information Technology (MPTIT) is expanding its technology park in Algiers suburbs (plan for similar projects in Oran and Annaba are in progress), a biotechnology pole is progressing towards completion in Algiers. Foreign businesses are finding the newly established infrastructures most welcoming and several IT and pharmaceutical companies are launching activities within. Nonetheless, the MHESR remains the main player in national R&D efforts and accounts for the bulk of existing R&D infrastructure. In terms of funding, 90% still goes to University laboratories with most of the remaining 10% allocated to research centres. The DGSRTD is continuing its reforms of the Algerian RTDI governance system. This requires organisational changes within universities to allow for more decentralisation of day to day project management activities. Most surveyed scientists note that inception-to-decision and decision-to-execution time requirements are the most important limiting factors facing their research activities.

Without repeating the practical hurdles already stated in the previous report (ACR 2011), qualified human resources availability remains the most important issue facing the quick implementation of the planned R&D development blueprint. Despite all the efforts, scientific research expenditures remain below allocated funding. While some research infrastructures are slowly coming to completion, others remain behind schedule which translates into sizeable cost increases and lost opportunities.

For the under-implementation plans to be effective, the general belief is that organisational and functional restructuring are required and so are: a strengthening of the DGSRTD's prerogatives and an effective participation and collaboration of all the players of the national research and innovation system and its governance. The active participation of all the stakeholders will facilitate the transition and the adoption of the new mode of operations. Overcoming the resistance to change is a major task which needs to be tackled effectively and efficiently. Human resources availability is another factor which needs quick resolution, opening up of the science and technology job market to foreign participation is a possible avenue which needs to be considered for its potential benefits, of which, a more active participation in international funding programmes and a more diverse collaborative partnerships.

Knowledge Triangle

	Recent policy changes	Assessment of strengths and weaknesses
Research policy	<ul style="list-style-type: none"> • Strengthening of the Directorate General for Scientific Research and Technology Development (DGSRTD) through added resources. • Restructuring of the National Research Programmes (NRP) initiatives with more focussed priorities. • Allowing for public funds to be used to establish joined Industry-academic research entities. 	<ul style="list-style-type: none"> • The creation of DGSRTD has brought new hopes to the scientific community. Communication seems to be more fluid and sector related information seem to be more easily accessible. • While new enacted laws permit greater mobility between academia/S&T and business sectors, implementation mechanisms are not clear. Information about such opportunities is not readily available and business partners still refrain from including scientists from the research community in their R&D efforts. • The first round of projects funded under the NRP initiative has come to completion. Industry-academia collaboration was found below expectations. • There is limited statistical coverage and evaluations that could offer ground for evidence-based policy. • EU collaboration remains very weak and in most cases is limited to short stays mobility • Information dissemination is still a limiting factor. Impact of funded projects remains limited to the project itself. • Active participation is still open to discussion.
Innovation policy	<ul style="list-style-type: none"> • New funding mechanisms were put in place to directly fund joint academia-industry research groups. • The National Agency for the Valorisation of Research and Technology Development (NAVRTD) has been strengthened and is now allowed to offer financial and in kind support to innovators. 	<ul style="list-style-type: none"> • In order to be considered proposals submitted for funding under the NRP initiative are required, to include business partners • The NAVRTD plays the role of knowledge depository and helps researchers and innovators in the process of intellectual property protection procedures. The NAVRTD is now able to finance small technology start-ups and spin-offs, it provides for last stage technology development cost and IP protection related expenses. • The main barrier to success for planned and implemented policies remains culture. Open information exchange, trust, mutual respect, and team building are at the heart of the enacted policies.
Education policy	<ul style="list-style-type: none"> • Implementation of the Licence, Master, Doctorate (LMD) system is being generalised and some organisational restructuring is underway. • Strong collaboration with EU and non EU countries is encouraged. Financial support is made available for mobility and related costs. 	<ul style="list-style-type: none"> • The implementation of the LMD system coupled with heavy investment in education and research infrastructure aligns the national education structure with its European counterparts.
Other policies	<p>Several mechanisms are in place to promote the creation of SME's by university graduates. Such mechanisms include;</p> <ul style="list-style-type: none"> • Zero interest State guaranteed small loans (Small Business Initiative) for young entrepreneurs and free housing for technology spin-offs and start-ups. • Tax incentives for recruitment of university graduates. The incentives include full salaries for new recruits in science and technology for up to 3 years. • State guaranteed large business loans for technology investors. 	<ul style="list-style-type: none"> • Private sector SMEs are still considered high risk for employment seekers. The public sector is still a strong competitor to private enterprise in terms of conditions of employment and overall benefits. • Administratively, the creation of a small business concern is still a complicated and lengthy process. This discourages young entrepreneurs (especially in the S&T fields where time is a critical aspect of project feasibility analysis).

Assessment of the national policies/measures

	Objectives	Main national policy changes over the last year	Assessment of strengths and weaknesses
1	Labour market for researchers	<ul style="list-style-type: none"> No changes have occurred during the past year. Research positions are largely within public institutions under public service regulations. (Mostly closed to foreign nationals and requiring a lengthy recruitment process for Algerian nationals and for those foreigners with special permits). 	<ul style="list-style-type: none"> The creation of the new research infrastructures has created many new positions. Some reports put the needs at 6,000. However, progress towards the filling up of these positions is extremely slow due to public service recruitment procedures. S&T careers are specific in terms of marketability of the candidates and the time sensitive nature of their competencies. Efficiency of new recruits is at its peak just after graduation, long wait times affect knowledge pertinence and validity.
2	Research infrastructures	<ul style="list-style-type: none"> Research infrastructure is strengthened by the addition of several research centres in biotechnology, materials science, computational science, medical sciences, biology, physics and chemistry as well as in social sciences. Common service centres are also under implementation. 	<ul style="list-style-type: none"> The new RI blueprint should allow for more efficient use of allocated resources as well as promote closer collaboration between scientists. Several projects are behind schedule leading to an overall reassessment of the development strategy with a more critical view upon feasibility and resource allocation issues.
3	Strengthening research institutions	<ul style="list-style-type: none"> New governance instruments are being put in place or expanded by the DGSRTD. These include scientific and technical societies and thematic agencies. 	<ul style="list-style-type: none"> Within the new organisational structures these new entities have no clear prerogatives and their participation is consultative at best. Some resistance to change is observed among old governing bodies which fear to see their prerogatives reduced and/or weakened.
4	Knowledge transfer	<ul style="list-style-type: none"> Business-academia-research instruments such as start-up incubators within university campuses and Business-University Liaison offices are still being implemented. Open access to S&T journals for scientists, scholars and students is now provided. 	<ul style="list-style-type: none"> These mechanisms are still in their infancy and impact evaluations are inconclusive. Better coordination and better information campaigns to publicise these efforts are needed. Business-Academia-Research bridges are still weak and confidence building measures are still lacking.
5	International R&D cooperation with EU member states	<ul style="list-style-type: none"> Stronger collaboration with EU institutions is still a priority set forth by the Algerian government. Support mechanisms to encourage Algerian participation in EU research programmes include frequent information campaigns. A review process of the Algeria-EU S&T collaboration is underway, and should lead to a better organisation of the monitoring of funded projects. 	<ul style="list-style-type: none"> Mobility between EU Member States and Algeria is still an issue due to harsh visa requirements for Algerian nationals. French language preference among Algerian scientists limits Algerian participation essentially to programmes using French as the principal communication language.
6	International R&D cooperation with non-EU countries	<ul style="list-style-type: none"> Launching of new bilateral cooperation agreements with an emphasis on more dynamic south-south partnerships. South Africa is often listed as an example to follow in nanotechnology and energy. Activity on the African front has known a qualitative jump with the recent creation of the Pan African University. The Pan African institute for water resources and renewable energy is located at the University of Tlemcen (Algeria). 	<ul style="list-style-type: none"> Stronger south-south collaboration will allow for the study of subject matters more in relation with local needs. Too many collaborations could strain the available project management resources, yield system overload and promote procrastination and loss of commitment.

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1 INTRODUCTION

The main objective of the ERAWATCH International Analytical Country Reports 2012 is to characterise and assess the evolution of the national policy mixes of the 21 countries with which the EU has a Science and Technology Agreement. The reports focus on initiatives comparable to the ERA blocks (labour market for researchers; research infrastructures; strengthening research institutions; knowledge transfer; international cooperation). They include an analysis of national R&D investment targets, the efficiency and effectiveness of national policies and investments in R&D, the articulation between research, education and innovation as well as implementation and governance issues. Particular emphasis is given to international research cooperation in each country.

2 PERFORMANCE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM AND ASSESSMENT OF RECENT POLICY CHANGES

2.1 MAIN POLICY OBJECTIVES / PRIORITIES, SOCIAL AND GLOBAL CHALLENGES

The last two decades have witnessed increased interest in scientific research. Scientific research and technology development policy were rethought and new measures were gradually implemented to achieve the mid and long term goals. Two laws were enacted to redirect the sector and provide the legal basis for the newly defined missions. The first law 98/11, enacted in August 1998, covering the period from 1998 to 2002 concentrated around organisational restructuring. It aimed to create stable research institutions, promote long term R&D funding (i.e. institutional funding), set priorities, and provide the necessary means to achieve research excellence. Under this scheme the law identified 30 national priority research programmes and provided for adequate funding for 6,026 research projects falling under the predefined national research priority programmes.

Due to concurrent internal and external causes, law 98/11 remained in effect until 2008. Procedural sluggishness and other more pressing national priorities (national security and political reforms) delayed progress of initiated restructuring measures. It was not until early 2008 that the environment was deemed ready for the second set of measures to be enacted. Law 08/05 was voted and enacted in February 2008 (due to cover the period from 2008 to 2012). It set the objectives of reinforcing the positive developments already in place and correcting observed shortcomings resulting from the implementation of the first law (98/11). The most important measures which came as a consequence of this second law are;

- Establishment of the Directorate General for Scientific Research and Technological Development (DGSRTD), in September 2008
- Revalorisation of research premium for researchers, in October 2010
- Establishment of the National Evaluation Council (NEC), in January 2011. The NEC is in charge of elaborating the national framework (procedures, coding, bibliometrics etc.) and the charter of evaluation (principles, ethics, and deontology). It is also in charge of evaluating research policy and its impacts.
- Establishment of support measures aimed at encouraging international collaborations (especially with Algerian Diaspora active within foreign research and higher education institutions).
- Establishment of support measures encouraging scientists and academics mobility (internal -cross sectorial- and external -international-).

In addition, law 08/05 prioritises R&D and innovation as a major driver for socio-economic development and technological independence. It earmarked a €1b (100b DZD) fund for the creation of many R&D centres, scientific poles of excellence, shared scientific installations (service centres), large scientific equipment acquisitions and high-tech business zones.

Year 2012 witnessed more progress in the execution of some of the most important measures of law 08/05. The DGSRTD saw increased activity and took full charge of

its defined prerogatives. The valorisation measures that were decided during 2010 (such as increased salaries for scientists) were expanded to cover other research support personnel. Compiling this report has required the extensive use of data gathered from several sources. Economic data was essentially obtained from IMF and World Bank sources, when available, local government sources were used (mainly, from the Ministry of Finance, the Algerian Office of Statistics and the Algerian Ministry of Planning and Statistics). When in conflict, the data from international institutions was used. For analysis, worst case data was considered to allow for comfortable error margins. Data pertaining to higher education statistics was compiled from the Ministry of Higher Education and Scientific Research (MHESR) and the Directorate General for Scientific Research and Technology Development (DGSRTD) sources. When no data was available sample interviews and mailing were also used (especially for private sector contributions and involvement as well as overall evaluation of the effects of the enacted policies). When data was obtained in such a way, it is clearly indicated in the document. Finally, we will stress that reliable data was difficult to obtain as the sector under analysis (Scientific Research and Technology) was highly segmented. More local data sources were available since 2011, thanks mostly to the effort of the Directorate General for Scientific Research and Technology Development which is making full use of internet technologies and spending great efforts to render information more easily attainable.

The most pressing challenge faced by the S&T research sector is the availability, in sufficient numbers, of qualified human resources. It comes to no surprise that one of the most important changes witnessed during 2011 was the establishment of the National Evaluation Council (NEC) –January 2011- and the National Commission for Evaluation of Universities (NCEU). The *raison-d'être* of these two entities is to oversee the ongoing reforms of the Algerian higher education system and ensure closer ties between academic curricula and market needs. Special circumstances have, however, not allowed for these entities to meet to date

Similarly, during this same year, support measures were put in place to;

- 1) Encourage Intersectoral mobility of researchers. Laws were enacted permitting scientists from public research organisations and/or higher education institutions to contribute to the development of R&D initiatives within business concerns (public or private). The latter would benefit from tax incentives and in some cases public funding to cover the related costs.
- 2) Attract more active participation of the Algerian scientific Diaspora in national research programmes.

The most urgent challenge is to create enough jobs for the thousands of unemployed college graduates. Sustainability of the created jobs will depend on the development of a knowledge based society and the promotion of more technology oriented SMEs.

In the Algerian context, there are two competing needs, both requiring huge public investments and close monitoring. The first being the ever increasing number of new entrants in the higher education system (275,000 for the 2011-2012 school year alone) and the exiting 100,000 new college graduates in need of jobs. The first requires new higher education infrastructures to be completed, equipped and manned every year, and the second demands, either the opening of new public research institutions or, the rapid transformation of the Algerian business fabric to knowledge based economic activities capable of absorbing the graduates. These two needs compete for the attention of the existing resources. While the Algerian government has maintained its commitment to allocate all the needed funding (an

aspect financially possible in light of the Algerian economic conjuncture), finding the needed human resources, without recourse to outside sources, has remained a major challenge during 2012.

The Algerian government's commitment to the development of the business sector cannot be more obvious than through the aid package addressed to the business sector. The Algerian government has allocated €4.2b (420b DZD) to a fund aimed at financing business sector reforms (technology transfer, knowledge based activities, creation of R&D divisions, managerial Audits, etc.). The fund, created in 2010 to cover the 2010-2014 period, has just started its first funding operations. The fund is managed by the National Agency for the Development of SMEs (www.andpme.org.dz) under the Algerian Ministry of Industry and the Promotion of Investment (MIPI). While funds are not an issue, managerial resources availability seems to be the limiting factor. Under this state of affairs, subject matter priority is not the controlling factor, all fields of research receive the requested funding and none receives any preference. The priority lies in bringing the higher education/scientific research sector into the equilibrium required to allow for a greater attention to be given to quality issues.

2.2 STRUCTURE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM AND ITS GOVERNANCE

Main actors and institutions in research governance

Algeria is the largest country on the African continent, covering an area of 2,381,741 km². The last confirmed data puts the Algerian population at 38.48 million inhabitants with a 238% growth rate over the past 50 years. Financial Year (FY) 2012 sets Algerian GDP at €160b (16,000b DZD) (corresponding to 0.25% of the world economy). This result corresponds to an annual growth of about 2% (2011-2012). Algeria ended FY2012 with a reported €160b (16,000b DZD) in gold and foreign currency reserves (mostly invested in US Federal bonds), in addition to a sizable stabilisation fund cumulated through public budget calculations on the basis of undervalued oil export price (pegged at ~ 30 USD/barrel; the average price during the 90's). Known foreign currency reserves are expected to reach €170b (17,000b DZD) (FY ending 2012) source IMF. The last confirmed data sets the GDP per capita at €2,450 (245,000 DZD) (FY ending 2012). The GDP per capita adjusted by purchasing power parity (GDP per capita PPP) is reported at €5,645 (564,500 DZD) (2012). Corrected 2012 government budget values translate a deficit of 2.0% of GDP. During 2012, foreign debt remained mainly unchanged at 2% of GDP. The Algerian economy has remained relatively untouched by the international economic crisis which has allowed the government to maintain its policy of heavy public investment in all sectors and especially in the Education and S&T research sector. GERD to GDP ratio remained at 0.27% (2012). Data on BERD remains unavailable.

For 2012, it remains safe to consider that research is funded exclusively by the state. In view of the large public funds allocated to this activity, other sectors' contributions can rightly be considered negligible. In addition to funding publicly-owned research establishments, the state also provides for mechanisms allowing for funding of privately owned entities. The national research system is slowly gaining the necessary maturity and organisation to adequately manage the allocated funds to public or private Algerian businesses. While some information pertaining to Algerian

participation in collaborative projects with EU and non EU states is available and will be discussed under the appropriate header, funding inflow from such collaborations remains hard to obtain. It should be said, however, that the state strongly encourages the establishment of strong collaborative programmes with friendly states and the strengthening of existing agreements through increased activity.

With the advent of the DGSRTD, a more stable and efficient S&T governing structure is taking shape and more transparency in information dissemination is credited to the newly formed governing bodies.

National research is managed centrally by the Directorate General for Scientific Research and Technology Development (DGSRTD) established in August 2008, following the enactment of law 08/05 and being active since August 2010. This central executive body (managed autonomously) is also in charge of ensuring Intersectoral coordination of scientific research activities. In this task the DGSRTD is assisted by the Intersectoral Committee (ISC), Permanent Sectorial Committees (PSCs), five (05) Thematic Research Agencies (TRAs), the National Agency for the Valorisation of Research and Technology Development (NAVRTD) and Thematic Research Networks (TRNs - three active in 2012, in electronics, photonics and materials science).

The ISC is composed of experts from several Ministries in relation to one or more National Research Programmes (NRPs) topic. It is a consultative body which evaluates Intersectoral research activities and proposes priorities to be followed.

PSCs are ministerial bodies of development, coordination and sectorial evaluation of research activities and their impact on their specific sector. Each PSC concentrates its effort on the sector it covers, and proposes research themes and priorities for their own field of interest.

The Thematic Research Networks (TRNs) include strong participation of Algerian Diaspora and have proven very effective during the preparation of new research institution blue prints. The expertise of the participating scientists and researchers contributed to the overall improvement of research quality.

2012 witnessed a total overhaul of the Thematic Research Agencies arena. The Governance structure now includes 5 Thematic Research Agencies (figure 1) in line with the five National Research Priorities, namely, Science and Technology (basic Research), Health Sciences, Biotechnology, Life Sciences and, Human and Social Sciences. It is planned that all research funding from the National Research Fund will be funnelled through these agencies. Each agency will be responsible for the organisation, evaluation and follow-up of research activities (each in its own field). In addition, the Thematic Agency for Research in Science and Technology will fund joint Industry-Academia research activities.

The National Agency for the Valorisation of Research and Technology Development (NAVRTD) has kept its national status and has been put in charge of funding activities related to Innovation and Technology Transfer, including intellectual property issues and Industry-Academia research and development activities support, evaluation and follow-up. The NAVRTD has three regional representations (Oran, Ouargla and Constantine). An additional entity is represented by the Centres for Innovation and Technology Transfer (CITTs) which are in charge of valorisation of research results and transfer of scientific findings to the business sector for implementation. These centres provide technical resources (equipment, test beds, know how etc.) to innovators as well as support last stage technology development,

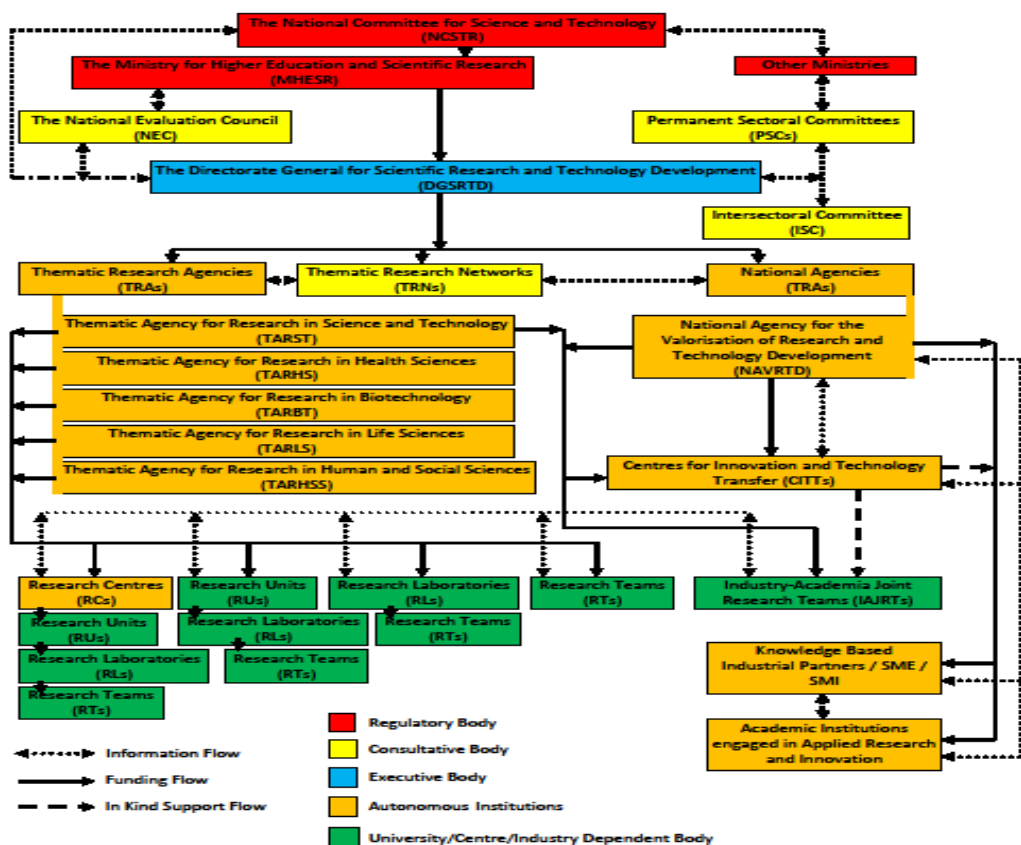
validation of data, and pre-commercial testing. They are destined to work more closely with individual researchers and their industrial partners.

For the moment the DGSRTD lacks direct representation at the University level (where most of the research performers are located). Funds allocated by the DGSRTD to university research laboratories are managed by the Vice President for Post Graduate Studies (for small budget items) and the Vice President for Planning and Prospection (for large budget items and infrastructures). This adds administrative burden and causes further delays in the execution of research activities.

The institutional role of regions in research governance

Regions have neither autonomy nor any role to play in research and innovation policy. For the moment there are no regional representations of the DGSRTD and all decisions pertaining to S&T policies are made centrally.

Figure 1: Overview of the Algerian research system governance structure



Regional entities, such as regional university conferences, are limited to data gathering and to providing feedback as to the effects of enacted policies. All central decisions are meant to be applied nationwide. However, while research centres are publicly funded, they are managed autonomously. This is not the case for University research laboratories, which are essentially dependent upon the president of the university in which they operate independently of the funding source.

Main research performer groups

While Algeria's business sectors counts over 600,000 SMEs (99% of which are private entities), most of the Research is still performed by public institutions. S&T Research is performed by university research laboratories (numbering 950 est. 2012) and 25 research centres and research units. In terms of funding it is estimated that 90% of the funding goes to university research laboratories which employ some 20,000 part time researchers (teaching researchers). These account for 80% of the Algerian scientific production. Research centres and research units employ close to 1,800 full time researchers and non MHESR affiliated research organisations account for an additional 500 active researchers.

The oldest and most important universities in terms of size, national recognition and scientific production are:

- University of Algiers
- Houari Boumediene University of Sciences and Technologies in Algiers
- Mentouri University in Constantine
- Mohamed Boudiaf University of Sciences and Technologies in Oran
- The University of Es Senia in Oran
- Aboubekr BELKAID University in Tlemcen (The University of Tlemcen)
- Djilali ELYABES University in Sidi Bel Abbas
- BADJI Mokhtar University in Annaba

Public research is undertaken in research centres and research units, the majority of which is under the supervision of MHESR. There are also researches entities supervised by other ministries and coordinated by the MHESR through the DGSRTD. All these centres are public establishments for scientific and technological research (also known under the French acronym EPST-Enterprise Publique de Science et Technologies). Researchers employed in these centres work full-time. Nearly 6,000 employees are active in these research centres, of which, 1,800 are researchers.

The main research centres coordinated by MHESR are:

- The Centre for the Development of Advanced Technologies in Algiers (CDAT), to which the Unit for the Development of Silicon Technology (UDST) is attached.
- The Research Centre in Welding and Control (CWC) in Algiers to which the Unit of Industrial Research in Iron and Steel Industry and Metallurgy (UIRISIM) in Annaba is attached.
- The Centre for the Development of Renewable Energies (CDRE) in Algiers to which three research units on applications of renewable energies are attached.
- The Research Centre in Physicochemical Analysis (RCPCA) in Bousmail.
- The Research Centre in Applied Economics for the Development (RCAED) in Algiers.

- The Scientific and Technical Research Centre for Development of the Arabic Language (STRCDAL) in Algiers.
- The Research and Studies Centre in Scientific and Technical Information (RSCSTI) in Algiers.
- The Research Centre in Biotechnologies (RCB) in Constantine.
- The Anthropological, Sociological and Cultural Research Centre (ASCRC) in Oran.
- The Scientific and Technical Research Centre on Arid Areas (STRCAA) in Biskra.

The most active research centres supervised by other Ministries:

- The National Institute of Agronomic Research of Algeria (NIARA) and the National Institute for Research in Forestry in Algiers (NIRF), by the Ministry of Agriculture and Rural Development.
- The Research Centre in Earthquake and Seismic Engineering (RCESE) and the National Centre for Integrated Building (NCIB) by the Ministry of Housing and Urban Development.
- The Research Centre in Astronomy, Astrophysics and Geophysics (RCAAG), by the Ministry of the Interior.
- The Institute for Educational Research (IER), by Ministry of Education.
- The National Centre of Space Technologies (NCST) in Oran, by the Ministry of Posts, Information and Communications Technologies.
- The National Research Centre in Archaeology (NRCA) and the National Research Centre for Studies in Prehistory and History (NRCSPH), by the Ministry of Culture.
- The Atomic Energy Commissariat (AEC) with its four R&D centres, by the Ministry of Energy and Mines.

2.3 RESOURCE MOBILISATION

2.3.1 Financial resource provision for research activities (national and regional mechanisms)

Scientific research is almost completely financed by the state (99%). The vast majority of allocated funds are pooled under the National Fund for Scientific Research and Technological Development (NFSRTD). This fund is used to finance equipment acquisitions, some infrastructure building as well as ongoing research projects under the National Research Programmes (NRPs) initiative. Other sources of funding, also controlled by the MHESR, are allocated to special international collaborative programmes to be used for researchers, academics and students' mobility or to fulfil Algeria's co-financing commitments under bilateral S&T collaboration agreements. Other ministries have set up small funds to support research projects directly related to their sector of activity as well as operational cost of research centres under their jurisdiction.

S&T research funding is allocated based on a 5 year plan. Fund managers are expected to spend all the allocated amounts by the end of the period. Subsequent funding levels are usually calculated on the basis of invoiced amounts corrected for inflation. Law 08/05 requires that NFSRTD funds are spent for the support of research activities related to the 34 National Research Programmes (NRPs) initiative (as defined by law 08/05). In the 2008-2012 five year plans, the NFSRTD allocated

€1b to support infrastructure development and research efforts. For FY 2012 the government allocated close to €50m (5b DZD) –approximately- (0.27%GDP) to additional funding. Although the target stands at 1% of GDP to be allocated to S&T, so far the system does not seem to be able to reach such spending levels (which for 2012 would have been €1.6b (160b DZD)). A new law is expected to be finalised before the end of the current year (2013). Initial reports state that national research programmes will be organised under fewer than 10 grouped priorities (most likely 5 matching the number of Thematic and National Agencies). It is also expected that the new law will eliminate the research stipend allocated to researchers under law 08/05.

Non-competitive funding

Funds allocated to scientific research are distributed among the 950+ university research laboratories and the 25 active research centres and research units (soon to reach 40).

Research entities receive an annual operational budget calculated on the basis of the number of researchers working within an entity. Additional funds are allocated for specific research projects conducted within the research entity. Operations and development (extensions, equipment acquisitions etc.) budgets are allocated based on a multiannual development plan. Under this scheme, each research entity is required to present a multiannual development plan (prepared by the Scientific Council of the research entity). Once evaluated and adopted by the Permanent Sectorial Committee, the request is presented to the DGSRTD for final approval and funding.

There are no official data available, but estimates put total non-competitive funding at more than 80% of the total. The new law is expected to reverse this trend and allocate a larger share under competitive funding.

Competitive funding

Competitive funding is obtained following a selection process. Calls for proposals are organised twice a year by DGRSDT for the implementation of the 34 National Research Programmes (PNRs) without setting any distinction or preference. It is expected that the national research programmes will be reorganised under less than 10 priorities.

Calls for proposals can also be initiated by Thematic Research Agencies (TRAs) depending on fund availability. There are five TRAs'. The Thematic Research Agency for Science and Technology (TRAST), The Thematic Research Agency for Health Sciences (TRAHS), The Thematic Research Agency for Life Sciences (TRALS), The Thematic Research Agency for Biotechnology (TRABT), The Thematic Agency for Human and Social Sciences (TRAHSS). A sixth agency (The National Agency for the Valorisation of Research and Technology Development) NAVRDT has no thematic scope, but coordinates technology transfer activities.

In general, projects are selected after proposal evaluation by expert panels (composed of peers). The selected projects are funded by the NFSRTD.

Funding is executed after the signature of a contract between the research team and the research entity (University, centre or research unit). The duration of the project is 3 years. The research team must present one mid-term report and a final report due at project completion. Continued funding is contingent upon acceptance of the mid-term report.

During the first round of funding (RFP 2010), each accepted project received 15,000 Euros, corresponding to 1.5 million Algerian Dinars (1 Euro = 100 DA). Funds disbursed under these competitive schemes accounted for 5.6 % of the NFSRTD fund. The new model limits the number of funded proposals and guarantees funding levels compatible with the goals set by each project

Other modes of funding

Other forms of research financing include initiatives by Ministries on their own budget:

- The Ministry of Urban Planning and Environment initiates open calls for proposals addressing environmental issues. It also established an annual “President’s award for environment” for the best work on environmental research.
- The Ministry of Posts, Information and Communications Technologies initiate calls for proposals for projects in the field of ICT.

There are no published data on these initiatives (as of October 1 2013).

Health research is financed by the DGSRTD (through the thematic research Agency TRAHS). There is no data available on Defence R&D activities.

Currently, efforts are concentrated around building R&D capacity, reforming the higher education system (to better meet job market needs) and the reorganisation of the S&T research structure. There are no specific mechanisms aimed at building trust between science and society as the latter is still dealing with more basic needs (especially, rebuilding basic trust after the decade of violence and destruction witnessed from late 1980’s to late 1990’s).

Societal challenges are addressed in the context of the 34 national research programmes with no specific preference. The new research law due to be signed in early December 2013, is expected to reduce the number of programmes from the current 34 to around 10.

2.3.2 Providing qualified human resources

The availability of qualified human resources represents a major challenge to the successful implementation of the national S&T research development plan. While the opening up of the research job market to foreign nationals is not, for the moment, considered an option due to the high unemployment rate among university graduates, several mechanisms are being pursued to mitigate this deficiency. 2012 saw continued support for the participation of the Algerian scientific Diaspora in the national effort; travel cost reimbursement, participation stipends and inclusion in the decision making processes are real opportunities to Algerian nationals working abroad. Sizable salary increases for academics and scientists went into effect during 2011, additional research activity bonuses were disbursed to active researchers making science careers more attractive to candidates who might otherwise opt for foreign institutions. In general, living conditions for scientists and scholars have continued to improve during 2012.

An estimated 40% of unemployed Algerians are college graduates. This yields waiting periods between graduation and the first job to exceed 3 years. Collected data from potential employers concluded that, by the time they are employed, Algerian

university graduates have lost touch with their field of studies and become less productive. To minimise this problem, the Algerian government has put in place several mechanisms encouraging SMEs to hire new, inexperienced college graduates at minimum risk. Several mechanisms would cover the salary and benefits (at minimum wage levels) of a new recruit for up to 3 years. Other mechanisms would provide guaranteed loans for new college graduates interested in starting their own businesses (in their field of study); currently new college graduates could apply for interest free loans of up to €100,000 (10m DZD) to start a business (in addition to fiscal advantages and reduced taxes for up to 5 years). Moreover, the Algerian government has put in place loan guaranteeing instruments to encourage banks to help young inventors in their quest to create an SME/SMI by providing collateral. While the idea behind these measures appears reasonable, it has led to some difficult issues related to work ethics and retention rates of new recruits (especially for those in the private sector).

The Ministry of Higher Education and Scientific Research is engaged in a profound restructuring of the higher education system and curricula design. Better targeting of job market needs is at the heart of the current reform. Several projects co-financed by the EU tackle this exact issue. The SPSP-HESR initiative is a €37m (3.7b DZD) programme, co-financed by the Algerian government and the European Union, which aims at supporting the Algerian governments' efforts to strengthen the capacity and improve on the quality of the national higher education system. Another EU funded project falls under the AVEROES programme. The latter, regroups several European and North African universities. Its aim is to engage the business sector in order to successfully develop university degrees specifically designed to address regional business needs. It should be noted that an estimated 60% of all college graduates are in engineering, science and technology fields with the remaining 40% hold degrees in Law, business, management, finance, accounting and humanities.

While all these measures are clearly changing the mindset of the Algerian scientific community, it remains also clear that unless there is a change in the economic nature of the country (moving towards knowledge based economy), the public sector will remain the main employment venue for Algerian scientists (which is clearly an unsustainable outlook).

Evolution towards the national R&D&I targets

Despite all the above mentioned difficulties, the Algerian research, development and innovation system is moving forward towards the targets set forth by the orientation laws of 98/11 and 08/05. A critical review of the so far achieved results cannot be completed without taking into account the limitations imposed by the environment in which modern Algeria is evolving. Regional instability, security issues and inherited problems from 10 years of destructive terrorism threat and activity have transformed all the planned reforms into reconstruction programmes. In effect, the last 15 years have seen the rebirth of a nation with all the meaning it entails. It should come to no surprise that the rebuilding of the destroyed infrastructure and the building of the needed one has turned into a game of making up for lost time, which is by no means an easy task. Nevertheless, successive governments, have since 1998, stayed on track and fully supported by the HE and S&T sectors. This unconditional support has led to some extraordinary results: tremendous increase in capacity and a remarkable improvement in the overall socioeconomic status of research and academic professionals. Changing the mind-set of all the stakeholder has proven more difficult. Building trust between the S&T research community and the business community,

while the whole country is mutating from a government controlled , socialist economy to a market economy, requires more than monetary resources, it requires an overhaul of the public administrations' attitude towards private enterprise, and a strong commitment of the business sector. These steps take time. With this in mind, understanding the accumulated delays in the implementation of the present development plan becomes possible and the reasons behind these delays might find logical reasons even if the consequences are found to be difficult to accept.

After limited qualified human resources supply, resistance to change is the most important hurdle facing the successful completion of the mutation process. The planned infrastructures are under construction, training programmes are being followed with partner countries, within the EU and outside of the EU, and the scientific community has taken proactive steps to secure the trust of the business sector.

The Ministry for Higher Education and Scientific Research (MHESR) is investing in business enabling infrastructures (incubators, technology transfer and innovation centres, common services centres etc.), the Ministry of Industry, SME and the Promotion of Investment is investing in technology innovation centres and the Ministry of Posts, Information and Communications Technologies is investing in technology parks. These are all innovation enablers and Intersectoral activity venues.

While demands for more targeted innovation oriented incentive measures have been expressed by the business community, to date no such laws or regulations have been enacted.

2.4 KNOWLEDGE DEMAND

The Algerian economy is still weak on knowledge demand. This is a weakness that Algeria shares with the rest of the MEDA region and most countries in a similar stage of development.

The Ministry of Industry, SME and the Promotion of Investment tries to stimulate demand via support to the business sector. It has created a superfund (€4.2b (420b DZD) covering the period 2010-2014) to assist SMEs interested in the adoption of new technologies, the acquisition of international accreditation labels, the use of modern management tools and the creation of R&D activities. The provided support covers the direct costs related to the implementation of the covered productivity improving measures. As of today there are no statistics regarding the effect of these measures on the business community.

The government is trying to stimulate demand via encouraging a more intense use of the internet to disseminate information and increase the visibility of Algerian business enterprises. Such action would promote knowledge based culture in a country traditionally known by a lack of access to information. Also promoting a more intense use of internet technologies is creating huge demand for the quick development of internet based technologies and businesses (demand for software developers, web designers, network administrators etc.)

2.5 KNOWLEDGE PRODUCTION

2.5.1 Quality and excellence of knowledge production

As far as scientific productivity is concerned, it is estimated that 20% of scientific publications are produced by research centres and units who employ close to 1,500 full time researchers. During the past 11 years, and since the enactment of the new policies on S&T research, the number of scientific publications by Algerian scientists has increased seven folds from less than 500 publications in 2000 to more than 4000 in 2012. It is to be noted that this number is still far below the international average (0.13 publication/Algerian researcher as compared to 0.33 publication/French researcher – to cite an operationally comparable country). The bulk of the scientific production (75% of all publications) is in chemistry, engineering, physics and materials science. These have traditionally been the fields of excellence of Algerian scientists. Through heavy investment in state of the art equipment, the Algerian government intends to push the volume of these knowledge contributions to new levels as well as promote the diversification of the fields of excellence to include computer science, biotechnology, biology, renewable energy and agriculture.

In terms of quality and excellence, Algeria counts few national scientific review journals, all attached to a higher education institution. While the level of the national scientific journals remains low (based on citations and distribution), these allow young researchers to engage in the study of local and regional scientific issues. To promote qualitative improvements on national knowledge production, the MHESR encourages the Algerian scientific community to publish in international journals (subject to more peer review scrutiny before acceptance). Such mechanisms include a better consideration of international publications during career promotion processes. Nevertheless, one should also stress that the English language barrier is an important factor hindering better visibility of Algerian scientific products.

The DGSRTD and NAVRTD are currently conducting a review of all the published journals and issued patents to better estimate the impact of ongoing reforms and newly enacted measures on product quality and the overall improvement of national research environment. Currently it is estimated that Algerian researchers yearly register in excess of 120 patents. It is, however, unclear if these are the result conducted within Algerian institutions or by Algerian nationals (including those living and abroad). Many Algerian inventors do in fact apply for patents in foreign patent office such as USPTO etc., very few patent applications are processed through the Algerian office, still in its early organisational years.

2.5.2 Policy aiming at improving the quality and excellence of knowledge production

MHESR has launched a programme for academics and scientists (all sectors), granting open access to all major scientific, technical and engineering journals.

For academics, the promotion from associate professor to full professor is based on two essential criteria 1) number of defended theses and dissertations under the supervision of the candidate and 2) the number of published works – dating after the last career promotion. Published works are considered on the basis of the impact factor (of the journal on which the publication appeared), under this scheme, the

higher the impact factor the higher the consideration given to the publication. A candidate receives a priority (for promotion) the more he/she publishes in world renowned scientific journals.

For Doctorate candidates, acceptance of the dissertation thesis is considered for defence only after the candidate has successfully submitted at least 2 publications. Again, the journal's impact factor enters into consideration during the review process.

On another front, the MHESR recognises, each year the scientist with exceptional scientific productivity. Similarly, other ministries acknowledge the scientist who contributed the most to the field of research related to their activities (i.e. the Ministry of Environment would recognise a scientist who would have contributed to renewable energy, green chemistry etc.; the Ministry of Post, Information and Communication Technology would recognise a scientist with above average performance in the fields of computer science or ITC in general). The Presidency has a President's Award given to the most exceptional scientist of the year. These different recognitions are in the form of sizable cash awards, visibility campaigns and, in some cases, additional funding for continued research. There are no clear indications as to the evaluation process by which these laureates are selected.

Finally, open access to scientific journals, through the DGSRTD, is a major contributing factor to the improvement on scientific production excellence. For a long time, Algerian scientists evolved in complete isolation from the outside world. Few were able to acquire copies of journals or specific publications for cost reasons. Most were relying on acquaintances or collaborators living abroad to keep informed of the latest developments in their fields of research. Thanks to the DGSRTD, this is no longer the case, and access to all major scientific journals is available to all scientists working within a research institution.

2.6 KNOWLEDGE CIRCULATION

2.6.1 Knowledge circulation between the universities, PROs and business sectors

Knowledge circulation between universities and the business sector is still very limited. This is due to 1) very few businesses operating an R&D department or having scientists among their personnel and 2) there is still some lack of confidence in the capabilities of the Algerian scientific community. The latter, creates mistrust and limits mutual respect between the two communities (university and business). Knowledge transfer and exchange remains based on personal relations and very limited in scope.

To palliate to this deficiency, many Universities have set up special teams to act as liaison between their colleagues and the business sector. These teams are organised in Liaison Offices, business incubators or business start-up support offices – within the university. These initiatives are still in their infancy and there are neither evaluations nor statistics as to their activities and success. However, their mere existence is a huge improvement.

2.7 OVERALL ASSESSMENT

2011 has witnessed the implementation of many measures aimed at reinforcing the S&T research structure. On the management side, the DGSRTD has completed its deployment and assumed its prerogatives. Research projects under the new NRP initiative are operational and the first review process is still in progress.

Under the incentive measures aspect, the government has effectively increased the salaries of S&T researchers, which improved on the living conditions of scholars and scientists. Similarly, doctoral students receive a considerable stipend which allows them to fully concentrate on their doctoral work.

Several capacity increasing projects are underway, new research centres, university laboratories and research units are slowly becoming operational.

Under knowledge transfer initiatives, the MHESR is strongly encouraging universities and research centres to engage the business sector and build long term partnerships. The MIPI is supporting the transition of the Algerian business sector towards more knowledge intensive activities through subsidies and direct financial support.

2012 saw the continuation of these efforts, the reorganisation of the S&T governance structure, the creation of more focused Thematic Research Agencies and the strengthening of the National Agency for the Valorisation of Research and Technology Development. This allowed for new academic-industry collaboration instruments. Establishing joint research teams is now possible and funding of joint research projects is now fully supported (encouraged) by the state.

This been said, despite all these efforts, the availability of qualified human resources and resistance to change remain major hurdles to be overcome for the timely implementation of the set plans. Deadlines are not being respected and some operational issues are coming to light. Intersectoral communication is still lacking and effort duplication is a times confusing.

Nevertheless, genuine efforts are maintained and open discussions seem to be addressing these issues. It is now recognised that much of the planned projects will have to be reviewed and closer attention given to the two main issues, namely, human resources availability and resistance to change.

3 National policies for R&D&I

3.1 LABOUR MARKET FOR RESEARCHERS

3.1.1 Stocks of researchers

Presently, there are 38,000 instructors (professors, associate professors and assistant professors) working in Algerian universities, of which 20,000 do research on a part time basis. Additionally, there are 1,800 full time researchers working with Algerian research centres and research units (under the MHESR jurisdiction) and an estimated 500 working within non MHESR research organisations. There are more than 1,500,000 students in Algerian universities and other higher education institutions. Presently, there are more than 60,000 students pursuing post graduate studies. The Algerian higher education system produces 100,000 graduates a year of which 10% hold a post-graduate degree (Magister, Doctorate). In light of these numbers, there should, however, be no shortage of human capital. It should be noted, that the Algerian higher education system suffers from systemic dysfunctions, for one the sheer ratio of students to professors standing at 40 to 1 (poised to get higher) greatly reduces the effectiveness of the system. At this level education quality becomes questionable and it becomes extremely difficult to properly ensure hands on experience for post graduate students. While human resources are available, quality human resources availability is in question.

3.1.2 Providing attractive employment and working conditions

The most notable incentive which took place during 2011, and reinforced during 2012, was the implementation of the new salary scheme for academics and researchers. University professors and researchers saw their salaries double (or triple) during this last year. With the retroactive nature of this measure (applicability to January 2010), university and research professionals saw their socioeconomic status greatly improved. Science careers are now well remunerated and it is expected that many more young Algerians will consider such careers.

Remuneration of researchers remains much lower than the equivalent in European countries, the USA and the Middle East. Still, Algerian scientists and researchers are less attracted by careers in foreign countries. It is worth mentioning that the few who still opt to leave Algeria are more attracted by Middle Eastern institutions in Saudi Arabia, Kuwait and the UAE. A non-scientific survey was conducted and those polled cited religious concerns as their first decision point followed by financial gains (lately, Algerian society – in general - views rising Islam phobia throughout Europe and the USA as an institutionally supported behaviour rather than the position of a small fringe of society). Judging by the numbers from the Algerian Diaspora attending national scientific conferences, and their expressed wish to return to Algeria, the DGSRTD expects that more Algerian scientists will be returning to Algeria (from western countries) then leaving (to the middle east).

3.1.3 Open recruitment and portability of grants

Research positions are mostly in the public sector and fall under public service regulations. Recruitment of public servants is limited to Algerian nationals following lengthy administrative procedures. Under special conditions, foreign nationals could hold temporary positions (contractual agreement). Some bilateral agreements provide for the temporary recruitment of nationals from the country party to the agreement.

Research grants are administratively managed by the research centre or university laboratory where the research is supposed to be conducted. Scientific management of the project is the responsibility of the Principal Investigator (submitting researcher). Mobility of the researcher does not affect the grant. Administratively the grant is still managed by the initial research centre or university laboratory and scientifically managed by the submitting researcher irrespective of his/her new place of employment.

3.1.4 Enhancing the training, skills and experience of researchers

It is mandatory for undergraduate students in technical fields (engineering) to complete a short training internship in a business setting. These are however limited to 4 weeks during the last semester of their undergraduate programme. Undergraduate programme managers encounter great difficulties in finding business venues for all the students. Businesses consider 4 weeks too short of period to take in a trainee for any useful purpose.

Students pursuing Masters Degrees complete all of their research work within a university laboratory and remain isolated from any hands on experimentation in an industrial/business setting. Most doctoral studies are also completed within university laboratories with interaction with research centres in some cases. Lately, doctoral schools are being organised around several collaborating universities, national research centres and international (usually French) higher education institutions. Practically, students enrolled in doctoral schools find great difficulties to satisfactorily complete their set programmes for lack of proper mobility mechanisms (especially between national institutions) and unclear programme management structures.

English mastering remains a major hurdle facing graduate students in technical and scientific fields (access to knowledge in scientific publications). Lately, students graduating from Algerian universities are found less fluent in the French language as well. To palliate to these deficiencies, the MHESR heavily supports international mobility initiatives and encourages students to spend longer periods within foreign institutions (preferably working on the experimental part of their research work). Still, no specific measures aimed at tackling the language problems early in the curriculum (undergraduate and graduate) have been found. The few initiatives are limited to including an English communication course in the undergraduate programmes or later during the Masters programmes. However, in every case, the course was taught by non-specialists (for example, in chemistry departments, the English course is taught by a chemist who has some English credentials –such as graduating from a British or US institution- etc.)

Career paths for academics and researchers remain a highly contentious issue. Review processes of achievements by scientists in general remains opaque and unclear. Arguably, promotions for scientists (academics and researchers) are based on number of years in position, with minimal consideration for scientific productivity.

3.2 RESEARCH INFRASTRUCTURES

Currently the Algerian research network counts 950 university research laboratories, 25 Research Centres and Units (to reach 40 by end of 2015). The construction and equipment of several additional research centres are scheduled to be completed (or at least launched) by the end of 2013. A complete restructuring of the research infrastructure scene is expected to take place within the next 12 to 36 months. In addition to research centres and the centres for innovation and technology transfer, the DGSRTD has launched the construction of regional centres of physicochemical analysis, and technical support centres. When completed, these centres will be equipped with state of the art equipment which will be shared by several research centres and university laboratories. This pooling of resources is expected to lead to better collaboration between the different researchers, and to promote multidisciplinary research initiatives.

To date, the National Centre of Industrial Technologies, the Research Unit in Electronic Components and the Research Unit in Photonics are already active in Annaba, Algiers and Serif, respectively.

In addition, 3 regional centres of physicochemical analysis, 17 technical support centres, two innovation and technology transfer centres and an observatory in Astronomy are close to completion.

Additional research centres are being completed in the following fields: science and materials engineering medical sciences, agro alimentary sciences, green chemistry, major risks, mine and metallurgy, environment and sustainable development, water resources.

The Algerian energy sector is involved in large projects for the transport of gas (MEDGAS) towards Europe via Spain and the development of renewable energies with Germany (DESERTECH). The latter should provide the perfect testing grounds (infrastructure) for large scale, novel renewable energy production technologies.

3.3 STRENGTHENING RESEARCH INSTITUTIONS

3.3.1 Quality of National Higher Education System

As stated above, the availability of quality human resources is the most pressing issue facing the emergence of an effective R&D&I activity. So far, the urgency in the HE system is in coping with the numbers of the ever increasing flow of new high school graduates applying for university degrees. This, coupled with the lack of university professors affects the quality of university graduates. The MHESR is engaged in fundamental reforms and is actively seeking closer inclusion of the business sector. The design of new degree plans and curricula more in line with the needs of the job

market is at heart. Pressure from the emerging private business sector is pushing towards a more quality-focussed higher education system.

Considerable improvement of the socioeconomic status of academic professionals is expected to attract better quality candidates for the available university teaching positions. Additionally, the MHESR shows great interest in the return of Algerian nationals working in foreign higher education institutions. These actions are expected to greatly improve on the quality of the higher education system as a whole.

Presently, there is no quality assurance mechanisms implemented. Algerian Universities are found to occupy good positions within the Arab world (major Algerian universities in the top 10). Their positions lag tremendously within African HE institutions. The MHESR and the DGSRTD have announced new measures aimed at improving education quality. No details are available to date.

3.3.2 Academic autonomy

Presently, universities are not autonomous. They rely on the Public Service Administration for all their recruitment processes and on a centralised orientation system for their enrolled students. Universities are managed by a President (Rector) appointed by the Minister for Higher Education and Scientific Research. The appointed person will then choose his/her team of Vice Presidents (Vice Rectors) to be confirmed by the ministry. Each VP is in charge of a specific portfolio (Academic Affairs, Planning and Prospection, External Relations and Research). For financial matters, the President of the University relies on a General Accountant accredited by (and generally an employee of) the Ministry of Finance (on loan).

3.3.3 Academic funding

Universities receive their annual budgets from the MHESR based on the number of students and their development needs (according to regional demands –mostly population they serve). The allocated budgets do not take into consideration programme excellence or any other academic quality measurable. Less than 5% of University budgets are based on competitive processes. These include funds allocated to specific research programmes submitted by University researchers under the NRP initiative or following calls for proposal issued by the different thematic agencies. Master and Doctoral research costs are covered under the host university laboratory operations budget (allocated based on the number of researchers and students working within the laboratory).

3.4 KNOWLEDGE TRANSFER

3.4.1 Intellectual Property (IP) Policies

Scientists are strongly encouraged to apply for patents. Apart from scientific publications, the number of filed patents is a key factor under consideration for career promotion. The MHESR supports all costs related to patent filing by researchers working within public research organisations. Other mechanisms are

available for business sector innovators (private and public). The National Agency for Industrial Property (NAIP) offers highly subsidised patent filing procedures. Presently, patent filing with the NAIP follows a simple application process, followed by a short (6 months) evaluation process for precedence and patent infringement issues (completed at no cost by the NAIP and the NAVRTD). The process is then concluded by a country specific PCT (Patent Cooperation Treaty) certificate issuance. The inventor has 12 months to apply for international coverage.

3.4.2 Other policy measures aiming to promote public-private knowledge transfer

Many efforts are currently made by DGSRTD for a more active involvement of universities in research projects directed to the business sector. The NFSRTD funds the creation of spinoffs and the commercialisation of research results. There are no venture capital schemes despite some attempts in the past.

Although the law on research encourages Intersectoral mobility, there are no specific measures, or reported actions taken by the MHESR or any other ministry, the exception being the Ministry of Defence which encourages implication of civilian researchers in its research programmes within its research facilities.

So far there are no data which would allow for an objective evaluation of the impact of enacted measures on the business sector.

Spinoffs

Universities are encouraged to establish close ties with the business community and to promote the creation of spinoffs by their young graduates and professors through the inclusion of business courses in engineering curricula and the development of entrepreneurial acumen. Few universities have put in place spinoff incubators within university premises; this lack of excitement is due to unclear financial status of such incubators as well as no well-defined funding mechanisms for the activities held within these incubators.

Inter-sectoral mobility

While Intersectoral mobility is encouraged, implementation mechanisms are still lacking (especially from the business sector side). Universities do include business professionals in their academic programmes as visiting scholars, associate professors or to provide the student with hands on experience through workshops and seminars. During 2011, the National Defence Ministry (NDM) was first to successfully submit a law which defines the remuneration mechanisms and professional status of researchers working on joint NDM-MHESR research projects.

Promoting research institutions - SME interactions

The Algerian business sector is not, at the moment, knowledge intensive. Algeria counts 600,000 SMEs, less than 0.1% is considered high tech. When it comes to innovation potential, IT and Pharmaceutical companies are the most promising candidates. The Ministry of Post, Telecommunications and Information Technology

is the most active in promoting close interaction between research institutions and IT SMEs. It does so through grants, heavily subsidised development programmes, organisation of workshops, informative events, etc.

Involvement of private sector in the governance bodies of HEIs and PROs

Currently private sector representatives cannot take part in the governance bodies of HEIs and PROs. HEIs and PROs Board members are set by law and usually include government representatives and other HEIs and PROs executive members. However, the law does not prevent the creation of consultative bodies which could include private sector representatives.

Regional Development policy

There are no regional R&D&I policies in effect. All enacted policies are national, to be implemented equally over the whole territory. However, procedural mechanisms set by the DGSRTS are affecting the regional R&D&I fabric. The DGSRTD no longer dictates the type and focus of regional research organisations; instead, it requests the regional players to submit proposals based on regional specificities including available human resources. This procedural change has allowed the emergence of poles of excellence, such as the Biotechnology Research Centre in Constantine, a region known for its burgeoning pharmaceutical industry and, the soon to be operational Green Chemistry Research Centre in Oran and the Materials Science Research Centre in Tlemcen regions respectively known for energy and microelectronics industries.

3.5 ASSESSMENT

2012 saw a continuation of the actions initiated in 2011. Despite international economic troubles, the Algerian government has been able to maintain its commitment to the scientific community. Unprecedented salary increases have tremendously improved the living conditions of the science and technology professionals. Many infrastructures are being built and equipped, and it appears that the newly founded DGSRTD is slowly asserting itself as a central planner for all national R&D&I initiatives. While no efforts are spared to increase S&T capacity and establish a national R&D&I system, seemingly insurmountable challenges are recognised.

Availability of quality human resources is at the forefront of troubles lying ahead. The available numbers of researchers are found to be insufficient for the planned actions. Training is a time consuming task, and while no efforts are spared to ensure future availability of required human capital, progress is proving to be extremely slow.

As it is the case with any restructuring action, the old system is proving to be quite resilient, and resistance to change is found to be a major issue among the old guards. This is forcing a slower than necessary implementation schedule to be adopted. The creation of new governing bodies, giving priority to young generations of scientists and including business partners in the decision making process are all found to be easily legislated by hardly implemented in practice.

The successful implementation of the planned S&T reform does not depend solely on the MHESR, the DGSRTD or the scientific community; some limitations are created by laws and regulations as old as the country itself. The construction and equipment of new infrastructures is regulated by the procedures for public procurement. These procedures are found to be extremely tedious and lengthy. These limitations coupled with the lack of adequate representation of major scientific equipment manufacturers in Algeria, are responsible for delays in the completion of these infrastructures. Similarly, existing research organisations are still finding it extremely difficult to dispose of the funding available to them. Time seems to be against the quick deployment of an effective R&D&I system.

Efforts are underway between the MHESR, and the Ministry of Finance to resolve some of these issues and allow for simplified procedures to be put in place. To gain some time and fast track some of the most pressing actions, the DGSRTD encourages infrastructure project managers (person in charge of the project) to work closely with EU and non-EU collaborators in order to adequately define the necessary equipment and ensure proper (functional) design of these infrastructures. Already, these efforts are showing a great improvement on the level and quality of the infrastructures being built and the equipment being acquired, thanks to the level of funding being provided and the “money is no concern” policy supported by the government.

4 International R&D&I Cooperation

4.1 MAIN FEATURES OF INTERNATIONAL COOPERATION POLICY

An active international scientific cooperation is required for the development of Algerian research. The law on research, article 39, directs scientific research stakeholders to take the necessary steps to encourage international cooperation. This orientation tackles the central question of providing the favourable environment for more active international involvement in national research activities. The law stopped short of providing the legal instruments for foreign nationals' recruitment in national HEIs and RCs. This is understandable in view of the unemployment rate among university degree holders.

Chapter 10 of the General Report on research states that active scientific cooperation constitutes a major objective in the development strategy of Algerian universities and research entities. This is used as the new paradigm for the development of research and a corner stone in the action plan allowing the opening-up of Algerian universities and research centres to foreign collaboration. This approach aims at strengthening the international cooperation in particular with countries already having bilateral agreements with Algeria.

However, the challenge of setting up an organisational structure able to collect and disseminate all the regional and international funding opportunities remains unsolved.

Notwithstanding the above mentioned difficulty, Algerian scientists are active participants in international project tackling global challenges such as energy conservation, use of renewable energy sources and sustainable development (especially with Germany, France, Spain and Italy), as well as regional issues such as desertification, food supply and security (with African partners) and environment and pollution especially in the Mediterranean sea (with Mediterranean countries).

4.2 NATIONAL PARTICIPATION IN INTERGOVERNMENTAL ORGANISATIONS AND SCHEMES

The Algerian research sector does not take part directly in any networks of intergovernmental research infrastructures.

4.3 COOPERATION WITH THE EU

During 2011 the European Union and Algeria showed renewed interest in collaborative initiatives under the Euro-Mediterranean Agreement framework. Negotiations which were initiated on 16 November 2009, resulted in an agreement officially installed on 14 October 2010. The final Agreement between the European Union and the People's Democratic Republic of Algeria on scientific and technological cooperation was made public on 6 December 2011. The formal signing of the agreement was completed in 2012.

4.3.1 Participation in EU Framework Programmes

Based on confirmed data, Algerian participation in FP7 has reached 41 main listed proposals (for 217 submitted applications), this translates in 19% success rate. In comparison to other countries, this success rate is a measure of the good quality of Algerian participation. However, judging by the number of participants (standing at 253 over the more than 1000 research entity), it appears that interest in EU funding is still lacking among Algerian scientists.

In terms of types of projects Algeria scores highest in coordinated and supported action, although the highest number of applications is for collaborative projects, where its success rate is less than 12%.

Algeria Contract type of the FP7 projects with country's participation

Proposal Sub Funding Description	Number of Proposals	Number of Proposals
Collaborative project for specific cooperation actions dedicated to international cooperation partner countries (SICA)	59	7
Collaborative project (generic)	7	1
Coordinating action	30	12
Integrating Activities / e-Infrastructures	4	1
International Research Staff Exchange Scheme (IRSES)	13	5
Large-scale integrating project	7	1
Small or medium-scale focused research project	34	3
Supporting action	51	11
Non elsewhere classified	12	
Sum:	217	41

Algerian research teams have always had enormous difficulties in taking part in this type of projects; participation procedures to the FP are seen as complex and often discouraging. The installation of National Contact Points (NCPs) for all FP7 activities does not seem to have stimulated the Algerian participation. Lack of funding for NCP activities does not make matters any simpler. It is worth noting that NCP activity is conducted on a voluntary basis and as such, besides information dissemination, all other initiatives are met with very little enthusiasm from the scientific community and the decision makers, alike. In addition, the inclusion of Algeria in the few EU projects came as a result of the determination of Algerian researchers established in European countries. Many of these researchers left the country during the 1990s. They currently constitute a valuable yet insufficient link with European research structures.

Algeria: Thematic Participation in the FP7

Proposal SP Description2	Proposal Program	All submitted		Mainlisted			Success Rate: applicants in mainlisted proposal / applicants in all submitted proposals - applicants from Algeria
		Number of Proposals	Number of Applicants	Number of Proposals	Number of Applicants	Proposal Total Cost	
SP1-Cooperation	ENERGY	19	24	3	3	21.693.570	12,50%
SP1-Cooperation	ENV	42	49	6	7	33.156.317	14,29%
SP1-Cooperation	HEALTH	15	16	3	3	8.609.733	18,75%
SP1-Cooperation	ICT	9	10	3	3	2.552.248	30,00%
SP1-Cooperation	KBBE	28	32	6	7	20.073.886	21,88%
SP1-Cooperation	NMP	2	2				
SP1-Cooperation	SSH	24	25	1	1	3.185.000	4,00%
SP1-Cooperation	TPT	6	6	1	1	648.678	16,67%
SP3-People	PEOPLE	19	26	5	11		42,31%
SP4-Capacities	INCO	29	37	8	14	14.102.713	37,84%
SP4-Capacities	INFRA	6	6	2	2	13.994.966	33,33%
SP4-Capacities	REGPOT	14	16	2	2	2.000.512	12,50%
SP4-Capacities	SiS	2	2	1	1	2.351.137	50,00%
SP4-Capacities	SME	2	2				
	Sum:	217	253	41	55	122.368.760	21,74%

No information is available on the share of funding from Europe Aid and the European Development Fund for RTDI development in Algeria. It is reported that for the period 2011-2013, the European Union engaged €172m, focusing particularly on the economic growth and employment and, on durable development and culture. To support sustainable development initiatives, the European Union is launching its first programme in the field of the environment and the climatic change with Algeria. There is no evidence of funds allocated directly to RDI, but in the context of other priorities like support of investment and entrepreneurship, R&D might be supported.

Participation in COST, EUREKA, FP7.

As stated above, participation in FP7 has been very modest. Noticeable Algerian participation is found in Health, Environment, Infrastructures, INCOnet, Energy, Transport, Agriculture, and ICT. The total budget of these projects is €89 m. Information about the amount which flows specifically to the Algerian research teams participating in these projects is not available. Information concerning the Algerian participation in COST and EUREKA programmes is not available.

Participation in ERA-NETs.

The National Institute of Agronomic Research of Algeria (NIARA) with the International Centre for Higher Studies on Mediterranean Agriculture ([ICH SMA](#)) participate in the [ARIM-Net](#).

Participation in European public-private partnerships

([European Technology Platforms \(ETF\)](#) and [Joint Technology Initiatives \(JTI\)](#))

Currently, there is no Algerian participation in European public-private partnerships. Joint Programming (JP) Initiatives.

The Algerian Ministry of Agriculture and Rural Development participates in a joint programme with the International Centre for Agricultural Research in Dry Areas ([ICARDA](#)), coordinated by NIARA. Within the framework of this programme, ICARDA will provide technical support on the following: climate change adaptation, combating desertification, increasing water productivity, agricultural intensification and diversification, capacity development, biodiversity conservation and utilisation, and biotechnology applications.

4.3.2 Bi- and multilateral agreements with EU countries

Bilateral agreements between France and Algeria provide for the most active collaboration programmes. Scientific exchange programmes between the two countries are long dated. Scholarship programmes and scholar exchange programmes are very active. Mobility funds for students and researchers are also provided under several programmes. The Hubert Curien (Tassili) programme is one of the most active in the area. Lately, the focus between the two countries has been put on the reorganisation of the Algerian higher education system. No data is available as to the size of funding spend and/or available for such programmes.

The MHESR has an ongoing agreement with the Spanish Agency for International Cooperation for the Development. This agreement provides for the shared funding of joint research projects between Algerian and Spanish universities' research laboratories.

Belgium, Portugal, Italy and Germany have S&T bilateral agreements with Algeria. Cooperation with these countries is gradually becoming more important.

4.4 COOPERATION WITH NON EU COUNTRIES OR REGIONS

The contribution of international cooperation in the development of research in Algeria remains low. During the three decades post-independence, the Algerian State granted scholarships to post graduate university students who chose the United States for S&T fields. For political reasons the former Soviet Union and in general eastern bloc countries were also considered destinations of choice especially for theoretical fields of study (mathematics, theoretical physics etc.). Lately, Canada is also considered a higher education destination (especially in the fields of electronics, computer science and management). The presence of relatively large numbers of highly educated Algerian nationals in these countries is setting up a strong basis for increased S&T collaborations. During the last decade, there has been a noticeable drive to diversify S&T collaboration partners. Bilateral agreements with the USA, South Korea, India, Brazil, South Africa, Indonesia, to list few, are in effect or, reportedly, under discussion. Below we list the most active based on available information.

There are many standing S&T cooperation agreements with African, Asian, north and South American but these are mostly dormant and have never reached the planned and stated importance and scale.

4.4.1 Main Countries

Algeria-Cuba: Cuban Algerian science and technology collaborations are long dated due to strong historical ties between the two nations. Yearly coordination meetings are regularly held to evaluate and readjust the collaborative process and ensure optimal utilisation of allocated resources to meet set goals. Algerian-Cuban S&T collaboration focuses mainly on three strategic fields of interests, namely biotechnology, genetic engineering and, agronomy and agriculture sciences and technologies. The existing collaboration agreement provides for exchange of graduate students, mobility of academics and scientists and finances inter-university collaborations on research and education programmes. It provides for the building of strong ties between the University of Algiers and the University of Havana as well as promotes the building of collaborative programmes between the Biotechnology Research Centre of Constantine and its Cuban counterpart. Data on funding provisions is not provided.

Algeria-Russian Federation: Russo-Algerian collaborations in the fields of science and technology, and higher education are long dated. These relations were further strengthened following the signature of the Strategic Partnership Declaration in 2001. A widening of the scope of the established collaboration, to include the participation of Russian businesses, was included in the 5 years (2010-2014) collaborative blueprint. Specifically, the 5 years plan focuses on mining, energy, agriculture and education. Data on funding provisions is not provided.

Algeria-South Africa: South African-Algerian collaborations in the fields of science and technology, and higher education was given priority as a precursor to a wider

south-south collaboration initiative launched by the DGSRTD. The two countries have reached an agreement by which they shall each contribute close to €80k/year to the establishment of a joint research centre in Algeria and launch active collaborations in the fields of nanotechnologies, laser physics and biotechnology.

Algeria-Tunisia: The two countries have ongoing S&T and HE collaborations. The last cooperation agreement signed on December 4 2008 is still in effect. The agreement provides for joint financing of collaborative research projects in the fields of energy, water, agriculture, health and social sciences. Data on funding provisions is not provided.

Algeria-United States of America: US-Algeria collaborations in the fields of science and technology, and education date back to late 1970s. Intense graduate scholarship programmes to support Algeria's oil and gas human resources needs (in related engineering fields) allowed many Algerians to pursue their masters and PhD degrees within US universities. While the return ratio was very low, those who succeeded in securing a professional career in the US are now seasoned scientists or occupy key positions within US businesses. Their contribution to Algeria's development is now being felt through closer collaborations between Algeria and the USA. Algeria is now an active participant in the Fulbright programme and, research funding is possible for joint research programmes through the DGSRTD and the US National Science Foundation (NSF). Interuniversity collaborations are strongly encouraged (many Algerian universities have standing Memoranda of Understanding in effect). For example, the University of Tlemcen has an ongoing collaboration with the University of Houston on the establishment of business engineering programmes. Algeria takes also part in the Middle East Partnership Initiative, funded by the US State Department, which supports social and academic reform projects. In addition, the US State Department has an ongoing initiative to coach Algerian S&T infrastructure projects through the financing of US experts' mobility costs. Algeria is also taking part in the Borlaug Fellowship programme, financed by the US Department of Agriculture, and aimed at promoting food security and economic growth by increasing scientific knowledge in new agricultural technologies. The Algerian-American chamber of commerce has initiated S&T start-up coaching programmes among other Business-Academia bridging initiatives. Data on funding amounts and provisions is not provided.

4.4.2 Main instruments

Cooperation with non-EU countries or regions is governed by bilateral agreements, or longer term framework programmes. When intended programmes fall under the sole jurisdiction of the ministry for higher education and scientific research, reduced scope agreements are initiated by the DGSRTD. For larger scope agreements and frameworks, the Ministry of Foreign Affairs is usually in charge of setting the general agreements and the definition of the fields of interest (when it comes to S&T) is left to the appreciation of the ministry for higher education and scientific research through the International Collaborations Office (part of the MHESR).

4.5 OPENING UP OF NATIONAL R&D PROGRAMMES

Inclusion of foreign nationals in national research programmes is encouraged, however the law does not provide for mechanisms which permit cash remuneration of the participating foreign scientists. Travel costs reimbursements are permitted and living cost while in Algeria are covered.

Presently, the interest seems more geared towards Algerian nationals living abroad. These could, under the law, obtain the same benefits as their resident colleagues.

4.6 RESEARCHER MOBILITY

4.6.1 Mobility schemes for researchers from abroad

Foreign scientists are welcome to participate in Algerian research or academic programmes. Unless covered by special contract or agreements, participating foreign nationals are not remunerated for their efforts. Travel cost reimbursements are allowed and living expenses are covered by the host institution.

Algerian scientist can, under the law, obtain the same benefits as their resident colleagues. For example, research projects under the NRP initiative provide for stipends for all contributing Algerian nationals (living abroad or resident). However, so far no instance has been found where the non-resident Algerian scientist did in fact receive the stated benefits for his/her participation in an NRP funded project.

4.6.2 Mobility schemes for national researchers

There are many mechanisms which promote International mobility of national researchers. In 2011, the MHESR funded in excess of 10,000 weeks of international travel time for HE and PRO researchers. Under this scheme, each researcher can apply for funding on the basis of an invitation from a host institution (from any country with diplomatic ties with Algeria) and a work plan to be completed during the work visit (not to exceed two weeks). Bilateral agreements between Algeria and some European countries (France, Spain and Italy being the most active) provide for mobility funding for Algerian scientists working on specific research projects. In general, there is no shortage of national political will or financial means encouraging Algerian scientists to establish more collaboration with their foreign counterparts. The main discouraging hurdle is related to lengthy visa procedures imposed by EU member states on Algerian nationals.

The MHESR also encourages Algerian university and research organisations to host foreign researchers and scholars and provides for the organisation of international symposia. In addition, joint academic programmes include foreign researchers and professors in their teaching teams. For linguistic reasons, joint academic programmes are most active with French institutions.

While national mobility of scientists (Intersectoral mobility) is encouraged and legislated, opportunities are rare and/or unpublished. Universities seem to be more open to know-how contributors from the business sector than the other way around. Business professionals are often called upon to provide hands on experience to university students through the teaching of practical courses or participating in seminars.

5 CONCLUSIONS

While no new actions were legislated during 2012, the government's has maintained its stated commitment to the national S&T sector. The sector's governing body goes to the highest government levels and all ministries are now required by law to invest heavily in science and technology and to promote by all means necessary the emergence of a knowledge based society. Priorities include: rethinking of the national higher education system, increasing scientific research capacity, improvements in the living conditions of the scientific community and establishing strong bridges between HEIs, PROs and the business sector. It should be understood that the successful implementation of all the policies enacted for this purpose will only be possible if all the stakeholders show the same level of commitment as that shown by the political leaders.

While the necessary funding is available, qualified human resources are lacking. Mechanisms to mitigate this shortcoming (in the short run) might require the consideration of other human capital sources; calling onto the Algerian Diaspora is a possibility being pursued. However, calling onto foreign nationals through open recruitment mechanisms (even on a temporary basis) does not seem to be an option.

During 2012, the DGSRTD has finalised its governance structure, strengthened its network of executive institutions, re-focused the National Research Programme under a more manageable number of priorities and, devised an efficient way to support stronger Industry-Academic collaboration through the revamping of the NAVRTD's prerogatives.

Finally, all the reforms seem to be directed at the MHESR. Through this report, it has become clear that some of the challenges facing the establishment of a strong and efficient R&D&I system are independent of the MHESR. Fiscal policies, fund management policies, fund disbursement mechanisms and the different laws regulating public tender mechanisms are not well adapted to time sensitive activities such as R&D. These are causing major delays in infrastructure completions, equipment acquisitions and research project execution.

6 REFERENCES

Ministry for Higher Education and Scientific Research: Statistics 2011, 2012, 2013
<http://www.MESRS.dz>

Directorate General for Scientific Research and Technology Development: 2011, 2012, 2013 achievements <http://www.NASR-DZ.org>

Official Journal of the Popular Democratic Republic of Algeria: 2010, 2011 and 2012 issues <http://www.JORADP.dz>

National Agency for the Valorisation of Research and Technology Development (2013)
<http://www.anvredet.org.dz>

National Agency for the Development of Small and Medium Enterprises (2013)
<http://www.andpme.org.dz>

The World Bank (country page) <http://www.WorldBank.org>

The International Monetary Fund (country page) <http://www.IMF.org>

National Office of Statistics (Office National des Statistiques) <http://www.ONS.dz>

United Nations Development Programme <http://www.dz.undp.org>

7 LIST OF ABBREVIATIONS

CITT	Centres for Innovation and Technology Transfer
DGSRTD	Directorate General for Scientific Research and Technology Development.
ERP Fund	European Recovery Programme Fund
FP	European Framework Programme for Research and Technology Development
FY	Fiscal Year
HEI	Higher education institutions
HES	Higher education sector
MF	Ministry of Finance
MPS	Ministry of Planning and Statistics
MPTIT	Ministry of Posts, Telecommunication and Information Technology
MHESR	Ministry of Higher Education and Scientific Research
MIPI	Ministry of Industry and Promotion of Investment
NADUR	National Agency for the Development of University Research (also ANDRU)
NADRHS	National Agency for the Development of Research in Health Sciences (Also ANDRS)
TARST	Thematic Agency for Research in Science and Technology (also ATRST)
TARHSS	Thematic Agency for Research in Human and Social Sciences (also ATRSSH)
TARHS	Thematic Agency for Research in Health Sciences (also ATRSS)
TARBT	Thematic Agency for Research in Biotechnology (also ATRBT)
TARLS	Thematic Agency for Research in Life Sciences (also ATRSV)
NRP	National Research Programme
NEC	National Evaluation Council
NFSRTD	National Fund for Scientific Research and Technology Development
NCEU	National Commission for Evaluation of Universities
NAVRTD	National Agency for Valorisation of Research and Technology Development
NADSME	National Agency for the Development of SME
NDM	National Defence Ministry
NCP	National Contact Points
NOS	National Office of Statistics
IMF	International Monetary Fund
ISC	Inter Sectoral Committee
LMD	License, Masters, Doctorate (academic curriculum)
PEST	Public Establishment for Science and Technology (Also EPST)
PRO	Public Research Organisations
PSC	Permanent Sectoral Committee
RC	Research Centres
RFP	Request For Proposals
RU	Research Units
RL	Research Laboratories
RT	Research Teams
R&D	Research and development
SF	Structural Funds

SME	Small and Medium Enterprise
S&T	Science and technology
TRA	Thematic Research Agency
TRN	Thematic Research Network