



REPUBLIC OF ANGOLA  
MINISTRY OF HIGHER EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL POLICY FOR SCIENCE,  
TECHNOLOGY AND INNOVATION

**PRESIDENTIAL DECREE No. 201/11:**

JULY 20

## **Specifications**

**Elaborated by:** MINISTRY OF HIGHER EDUCATION, SCIENCE AND TECHNOLOGY

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## SUMMARY

### President of the Republic

#### Presidential Decree No. 201/11:

Approves the National Policy for Science, Technology and Innovation. Repeals all legislation which contravenes the provisions of this presidential decree.

## PRESIDENT OF THE REPUBLIC

### Presidential Decree No. 201/11: July 20

The Constitution of the Republic of Angola establishes a number of assumptions to promote the citizen's scientific education towards excellence, quality, innovation, scientific and technological development and encourage the pursuit of scientific research;

The establishment of a knowledge society through the integration of science, technology and innovation in the development strategy of the country is a key factor to build a modern, economically competitive society that allows sustainable development, combating poverty and improving the citizen's quality of life;

Having the need to formulate rules to implement, in a consistent, comprehensive and effective way, the assumptions of science and technology able to support sustainable national development;

The President of the Republic, in accordance with paragraph d) of Article 120 and paragraph 1 of Article 125, both from the Constitution of the Republic of Angola, decret as following:

Article 1 - The National Policy for Science, Technology and Innovation is approved, attached to the present Presidential Decree and is an integral part of it.

Article 2 - All the legislation that is contrary to the provisions of this Presidential Decree is repealed.

Article 3 - Any doubts and omissions arising from the interpretation and application of this diploma shall be resolved by the President of the Republic.

Article 4 - This Presidential Decree shall enter into force upon its publication.

Appreciated by the Council of Ministers, in Luanda, on June 1<sup>st</sup> of 2011. This Regulation shall be published.

Luanda, July 7<sup>th</sup> of 2011.

The President of the Republic, JOSÉ EDUARDO DOS SANTOS.

## 1. INTRODUCTION

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Science and technology increasingly affect society and human life. The Research and Development (R&D) widen the horizons of knowledge and the borders of science, contributing to technological evolution. The technology allows protecting the environment, building safer homes, improving transportation systems and save energy. The scientific knowledge helps save lives and improves health standards all over the world.

The information and communication technologies help to increase productivity and citizens' access to knowledge and information.

To ensure that science and technology provide the answers that society and economic development need, it is necessary to encourage R&D, promote interaction between universities, research institutions, companies and civil society organizations, to foster innovation and disseminate knowledge. Policies for Science, Technology and Innovation (STI) seek to create conditions so that those developments become a reality. Knowing that scientific advances are not without risks, these policies also aim to minimize these and the sustainable use of natural resources.

The lack of a policy for Science, Technology and Innovation, the lack of coordination between different research actors and scientific production, technological development and innovation, as well as the dispersion of efforts and initiatives, have essentially eliminated the institutionalization of the National System of Science, Technology and Innovation (NSSTI), preventing the implementation and development of good practices, and consequently obtain better results, which are mainly characterized by specific goals, immediate and not sufficiently integrated into actions that aim the sustainable development of the country.

The National Policy for Science, Technology and Innovation (NPSTI) is a matter of great horizontal and strategic importance, because it constitutes a fundamental tool to promote the sustainable socio-economic development and a factor of unity, promoting social peace and rapprochement between peoples and strengthening regional and international co-operation.

In overall terms, the NPSTI, by inserting Science, Technology and Innovation in the Development Strategy of the country, aims to establish guidelines, in the best interests of building a knowledge society, combating poverty and improving

the citizen's quality of life. The pursuit of these goals will be attained through the sustainable development by building a modern and competitive economy, in harmony with the ethical principles, social equity and respect for people's health, environmental protection and responsible use of natural resources.

This document contains the following chapters:

**Chapter 2** Current situation of Science, Technology and Innovation in Angola, which realizes the general economic situation, education and relevant sectors to the STI;

**Chapter 3** National Policy for Science, Technology and Innovation, in which are presented the vision and mission of this policy, as well as their general and specific objectives;

**Chapter 4** Instruments and management of NPSTI, in which the general framework for policy implementation is formulated;

**Chapter 5** The NPSTI and the new challenges, that puts into perspective the development of the NPSTI.

## 2. CURRENT SITUATION OF SCIENCE, TECHNOLOGY AND INNOVATION IN ANGOLA

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The constitutional revision, made in 1992, defines the Republic of Angola as a democratic State of law. The former Constitutional Law (Law No. 12/91), established among its fundamental principles and rights, the national economic development and meets the needs of citizens, the respect and guarantee of the fundamental human rights and consecrated the building of a society knowledge. In this sense, to embody principles that emanates rights such as equality, respect, protection and defense of citizens, as well as the respect for human dignity.

The Constitution of Angola establishes in articles 21, 22, 79, 80 and 138, a number of assumptions that aim to promote the formation of the human being, excellence, quality, innovation and scientific and technological development, and encourages the pursuit of academic and scientific activity by governments or public officials.

## 2.1. General Economic Situation

The years that followed the proclamation of independence in 1975 were used for the country's defense and territorial integrity. Angola suffered a civil war that lasted 27 years and, as such, not only much of the industrial fabric support was destroyed but also a precious time was lost to the socio-economic development of the country.

In the period following the enforcement of peace in 2002, fueled mainly by its oil and minerals (diamonds) exports, Angola had a very dynamic macroeconomic performance and above the regional and global levels average, and was one of the fastest growing countries in these last 8 years.

This growth is mainly sustained by the oil sector, but it is important to note that a higher growth rate than for the non-oil sector was observed, since 2007 (see Table 1.1). This relationship has been maintained and, somehow, is indicative of a commitment to diversify the economy made previously by the Angolan Government.

**Table 1.1. Angolan Economic Global Growth (%)**

Growth rate (%)	2004	2005	2006	2007	2008	2009	1st semester 2010
GDP	11,2	20,6	19,5	23,30	13,80	2,41	4,30
Oil GDP	13,1	26,0	21,2	20,40	12,30	-5,10	7,10
Non-oil GDP	9,0	14,1	17,2	25,40	15,0	8,31	2,0
Diamonds	-	-	-	2,69	-8,19	4,60	-5,30
Construction	-	-	-	37,10	25,60	23,80	-18,41

Source: Ministry of Planning, National Plan 2011-2012

The first estimated numbers for 2010 indicate a reversal toward the scene of Oil **GDP** that passes from a negative growth rate of 5.1% in 2009 to an expected positive rate of 7.1% in 2010. Meanwhile, the projection is that the non-oil **GDP** reduces its rate of expansion from 8.31% in 2009 to 2.0% in 2010, mainly due to contraction in construction, fisheries and diamonds.

At the moment, Angola is under a process of massive reconstruction of its physical infrastructure and human capital. Although this growth has not been uniform for all sectors of national life, it seems that the growth observed in the extractive industry (oil and minerals) may help create conditions to boost growth in the most delayed sectors.

The Gross Domestic Product has continued to grow, despite the fluctuation of oil prices and the global economic downturn observed, with a particular emphasis, in 2009.

The oil production represents more than 50% of **GPD** (see Table 1.2), constituting 90% of export earnings of the country.



**Table 1.2. Growth rates of GDP and Sectorial Shares (%)**

Sectors	Growth rate (%)		Sectorial share (average)	
	2008	2009	2006-2007	2008-2009
Agriculture, livestock and forestry	1,9	29,0	7,54	10,21
Construction and public works	25,6	23,8	4,64	6,43
Energy and water	26,1	21,3	0,09	0,11
Non-market Services	1,9	5,9	7,73	6,95
Manufacturing	11,0	5,3	5,07	5,57
Oil and refined products	12,3	-5,1	55,76	51,74
Oil and gas	-	-	-	-
Geology and mines (diamonds)	-8,6	4,6	2,05	0,99
Fishery	-2,4	-8,7	0,29	0,23
Market services	26,9	-1,5	16,84	19,57
Education*	6,3	1,6	-	-
Health*	22,32	0,4	-	-

Source: Ministry of Planning, National Plan 2011/2012\* Specific indicators: Education, health and school staff, health facilities.

Due to the instability of the international oil market, the Government turned the commitment to diversify the economy in a strategic priority. Other important components of the GDP have been obtained from sectors such as banking, agriculture, forestry and fisheries.

The vulnerability of oil markets is a constant concern for the Government, given the country's extreme dependence on oil. On the other hand, there are concerns about the environmental impact of oil exploration and the extraction activities, particularly the effect of coastal activities in the fisheries industry.

The focus on science, technology and innovation is critical to support the growth and plays a key role in promoting sustainable development of this great country. This support should focus above all in the areas described below as critical to boost the economy, with regards to the environment, management and responsible use

of natural resources.

Areas such as Education and Vocational Training, Higher Education, Scientific Innovation and Technological Development, Agriculture and Fisheries, Telecommunications and Information Technology, Oil, Gas and Mineral Resources, Health, Water Resources, Energy and Environment have been identified by national experts and United Nations as being of great importance to the national economy and on them we should focus on them, in the first instance, the implementation of the National Policy for Science, Technology and Innovation.

## 2.2. Education and Science, Technology and Innovation, Organization of STI in Angola

The Ministry of Higher Education and Science and Technology (MHEST), established in February 2010 as a result of the merger of the previous Ministry of Science and Technology (MINSIT) and the Secretary of State for Higher Education (SSHE) is a body of the Executive, in interaction with the various bodies of national life, whose mission is the preparation, conduction, execution and control of the policies from the Executive power in the fields of Higher Education and Science, Technology and Innovation (Presidential Decree No 70/10, 19 May).

With the creation, in 1997, of a governing body for STI policy in the country (the previous Ministry of Science and Technology), the Executive of Angola has reinforced its commitment in creating of conditions to put Angola in the path of scientific and technological development.

Over the subsequent years some activities were carried out such as the preparation of legislation based on S&T, the creation of a Provincial Community Centers (Internet), of Knowledge Portal and Scientific Research, of an Investigator Career, the collection of subsidies to support the Government activity, the registration of authors and support for innovative activity. All this has contributed to a remarkable increase in the national consciousness about the importance of STI for development of the country and building a knowledge society.

Currently, we are witnessing the fragmentation of the National System for Science, Technology and Innovation (NSSTI), which results in a weak link between the actors

and the low profitability of the available resources, regardless of collective and individual initiatives in the pursuit of increased scientific production, technological innovation and consequent integration of knowledge and technology transfer in the productive sector, as well as the significant increase of the interaction between actors of the NSSTI and between them and the society in general.

The current organization of Science, Technology and Innovation, including funding for research, coupled with a lack of key documents that establish guidelines, principles, operating rules and assessment procedures, has not allowed the harmony between sectorial programs, isolated or collective initiatives and the monitoring of research activities.

So far, the observed levels of the STI's budget are far below the recommended in SADC (1% of GDP) and has not been possible to monitor the application of funds for scientific research and technological development, nor obtain from the majority of the National System Science, Technology and Innovation members, data for the preparation of the indicators of the STI.

In short, all this has resulted in a suboptimal use of resources and available means and in a one-sided assessment of the impact of investments and the performance of R&D institutions and their professionals.

### **Education, Culture and Vocational Formation**

Regarding the progress made, we must underline the positive impact of peace achieved in 2002. In 2009, regarding the general education level, the number of children who had have access to school doubled, due to the significant increase of the school number in the cities, peri-urban areas and rural areas. This, by itself, means that the state made a large investment in infrastructures and human resources training.

The boost to promote technical and vocational education, initiated in the mid-2000, began to show results. In addition to new training institutes and agricultural, technical, administration and management education, we also observe progress in school curricula. Other initiatives include the official recognition of the important role of education in national development and the need of a stronger scientific-

technical component of the education system.

Culture is considered complex since it includes knowledge, belief, art, morals, law, customs and all other skills and habits acquired by man as a member of society. It is also usually associated with higher forms of artistic expression and/or technique of humanity that are studied by social sciences and humanities.

Despite the enormous potential of culture as a source of stimulus for tourism and as a raw material for the creative industry, for the promotion of Angolan art and culture abroad, and to contribute to national unity, this sector is characterized by the scarcity of human resources and infrastructures for research and culture dissemination.

### **Higher Education**

In the past, university education in Angola was institutionalized with the creation of University General Studies of Angola, integrated in the Portuguese University, on 21th August 1962 (Decree-Law No. 44 530). On December 23th 1968 the transformation of University General Studies of Angola in Luanda University was determined (Decree-Law No. 48790), and in 1976, shortly after the proclamation of Independence of Angola, it was transformed into the University of Angola, through Ordinance No 77A/76, on September 28. In 1985, the University of Angola became Universidade Agostinho Neto (UAN), in memory of the first President of Angola and the first Rector of the University of Angola (Decree-Law No. 85, January 24, DR 9, Series I, of January 28, 1985).

According to the data published by the UAN in 2008, this university had formed only three Angolan until 1975 and about five thousand from 1975 to 2002, when peace was effectively achieved.

In six years of peace between 2002 and 2008, the number of people with a degree doubled. It was also apparent the improvement in quality of the teaching staff, although the quality of its composition is not yet satisfactory at this University. The percentage of professors with the scientific or academic degree of Master (M.Sc.) or doctor (Ph.D.) increased from about 10% in 2001 to 20% in 2008.

The composition of the teaching staff is even more concerning with the advent of private higher education, since most of these institutions don't have its own significant teaching staff. Not with standing the contribution that the private institutions have given to reducing the social pressure on access to higher education and training of senior technicians, the use of the staff of public institutions to teach their courses, creates an additional problem. For the teaching staff that is dispersed by school activities in more than one institution, there's no time left to dedicate to research and development, whether in public or in private institutions.

The creation, in 2009, by the Council of Ministers, of new higher education institutions distributed by seven academic areas, has created new opportunities for training and sustainable development in Angola. Data from 2009 indicates that the existing seven public universities and the ten private ones have approximately 80 thousand students, from which almost 52 thousands were enrolled in public institutions of higher education.

The rise in Angola of various higher education institutions also contributed to the decrease of the pressure of seeking formation abroad. In 2009, the Government of Angola supported the higher education of 1500 Angolan students abroad.

However, it is expected that the increased offer of higher education is accompanied by significant improvements in quality of education in both undergraduate and graduate levels, as well as in graduate courses. Therefore, it becomes more and more important that the higher education in Angola linked to scientific research, which boosts the quality of teaching and is a bulwark for the sustainable development of any country.

Despite these developments, there is a sharp lack of highly qualified staff (Ph.D.-level), focused on the areas of basic sciences (Mathematics, Physics, Chemistry, Biology and Portuguese, Medicine, Engineering, Agronomy, Veterinary Medicine) and others.

The existence of staff with scientific differentiation is a prerequisite for a quality education.

## Scientific Research and Technological Development

The various and urgent needs of reconstruction demand a definition of proprieties for scientific research and technological development, financed with public funds and to support the implementation of the Executive Program.

The lack of clear priorities is mainly a result of the lack of a NPSTI and its management and/or implementation tools, in order to respond adequately to the priorities in the field of science, technology and innovation which support the Executive Program in the short to medium term.

The current state of scientific research in Angola, according to the diagnosis of STI in Angola, published in 2008 by UNCTAD, as well as the indicators relating to 2008/2009, prepared by MHEST in 2010, shows a lack of scientific staff with high levels of education.

From the total number dedicated to research activities (framed and not covered by the Career of Scientific Researcher, CSR) only about 5% have a Ph.D., the remaining 17% have a master degree, 5% post-graduation degree, 57% are under-graduated and 16% have a bachelor degree.

Therefore, there is now a substantial lack of highly qualified scientific staff, unlike, for example, what we can observe in the University Agostinho Neto, comparing to other research institutions that have not made a significant commitment in increasing the training levels of their staff.

By definition, «investigator» is the one who practice science and is framed in the CSR, however, the number of under-graduated, master and Ph.D. researchers entirely devoted to research is high but, for various reasons, they are not framed on CSR, which created motivational problems. Only 28% of the total of under-graduated, masters and doctors that do full-time R&D are framed by the CSR, while the overwhelming majority (72%) waits for its framework.

Overall, there is an excess of workers in the administrative area of research institutions and technological development, as they constitute about 74%, the remaining 26% are distributed between researchers and research support.

The data for the period of 2008/2009 shows that the population of researchers is dominated by men (83%), women scientists are only 17%, although there are institutions such as the National Fisheries Research Institute, the National Institutes of Public Health and Luanda Herbarium, which are mainly composed by women.

The issue of scientific and technological production, as well as the motivation of the researchers, is on the agenda. In 2001 some measures were introduced to attract and retain scientists in public research institutions (Decree No. 4/01 and 40/01). These provisions, which included special remuneration scales and salary bonus for publications, need to be significantly improved to be really attractive and produce the expected results.

The current system of funding for R&D, associated with the low level budget for Science and Technology (for instance, 0,004% GDP in 2008 and 2009 and 0.2% in 2010) generates an inefficient management and targeted use of the resources available, which has caused a bottleneck in the performance of research activities in of higher education, research and technological development institutions.

The limited availability of funds and the lack of a public financing system are the first constraint in addressing the essential needs for optimal use of funds for scientific research.

Another aspect is related to the lack of differentiated monitoring and a proper or specific rating system of the institutions that perform specific research and technological development, as well as their scientific staff, in order to increase the effectiveness and efficient use of resources made available and to promote scientific and technological production.

There is also the existence of a management model and structure of research institutions and technological development that, in practice, are no different from public institutions, which in itself limits the stimulation of activities with the R&D characteristics.

## Entrepreneurship and Innovation

Creativity is an important aspect to be considered in order to boost entrepreneurship, technological innovation and the offer of new products and quality services. That lack in the Angolan society. Until recently, the innovation was exclusively dependent on to industrial policy (UNCTAD, 2007), observing, since 1975, a pretty bad record of patenting (data from the Angolan Institute of Industrial Property - IAPI), which, in part, can be explained by the lack of a dynamic industry.

However, the diversification scenario of economy and the increase of products and services are created in a favorable environment to entrepreneurship, to innovation and human, organizational and technological development. This may be the reason why it is notorious, since 2009, a greater mobilization of Angolan society around creativity and innovation.

Currently, there is a great conjoint effort of various social actors and the deployment of initiatives to promote innovation activity and intellectual property protection, which lays the foundations for the creation of a national base of entrepreneurship and transfer of appropriate technologies to support the sustained growth of national production.

To ensure the sustainability of innovation in Angola it is necessary to optimize the benefits of man formation, supplementing it with the access and appropriation of new technologies.

## Intellectual Property and Author Rights

In Angola there are two legislative regimes covering intellectual property rights (IPR): the Industrial Property Act 1992, which covers patents, trademarks, industrial and utility models, appellations of origin (geographical indications) and unfair competition, and the Law Copyright 1990.

The implementation of these laws falls under the jurisdiction, respectively, of the Angolan Institute of Industrial Property, an agency under the Ministry of Geology, Mines and Industry, and the National Institute of Cultural Industries/

National Directorate of Entertainment and Copyright in the Ministry of Culture. The intellectual property protection for plant varieties has not yet been enacted, although, according to a 2005 report, a draft Law on Plant Breeders' Rights has been established.

Both intellectual property laws precede the accession of Angola to the WTO in 1996 which requires the compliance with the provisions of the Agreement on Trade-Related Intellectual Property Rights (TRIPS). The deadline for the fulfillment of these standards for underdeveloped countries is from 2013 to 2016, in the case of drugs and related processes.

Although existing laws should be revised, it is not clear that this condition will inhibit innovation or the acquisition of patented technology from abroad. In the latter case it may be the lack of capacity that is preventing their appropriation. However, as technological capability is a process being implemented, for example in ICT and development of software, the IPR protection may need to be strengthened in time, in specific areas. These matters must be considered in the improvement of existing legislation to conform to TRIPS requirements.

On the other hand, IPR reform should take into account that stronger IPR regimes can become a barrier to the acquisition and development of patented technologies and thus prevent the formation of capabilities. Some measures should be taken to ensure that the flexibilities of the TRIPS agreement, in particular with regard to compulsory licensing, can be fully utilized when appropriate.

Even in the absence of conflicts of interest, the ability to negotiate technology licensing agreements is also essential to ensure the access of local firms to foreign technology on favorable terms.

Finally, it should be noted that the current intellectual property laws still distinguish industrial property and copyright regimes, a distinction that is not as clearly marked in other countries. The copyrights, for instance, expanded beyond artistic creations to include applicable knowledge for the industry.

On this basis, and taking into account the shortage of qualified and experienced personnel for the review and implementation of IPR laws, the unification of all IPR regimes under a single mandate and/or Intellectual Property Office is justified.

### 2.3. Other Sectors of Agriculture and Fisheries

In strategic terms, the current policy on agriculture is oriented to encourage the raising of human capital, to extend the areas of irrigated crop, to improve market access, to develop research and experimentation capabilities and to enhance technology diffusion.

However, there are only small niche skills of STI in the agricultural sector and there is no systematic mechanism for the accumulation of learning and dissemination of knowledge. The escalation learning benefits is constrained by the lack of human resources and by the inadequate funding.

The current policy reflects a vision of long-term agricultural development, based on three production levels: family business, small-scale commercial and industrial business.

The structure of the production system, dominated by subsistence agriculture, needs more support and better structuring. Although some growth in the farming sector is being observed, the family production lacks of a bigger support, particularly regarding the provision of improved seeds, conservation and disposal of crops and information on the estimates of rainfall and drought.

Activities in ICT regarding agriculture are, at the moment, concentrated in reducing the problems of food security through the introduction of factors that increase productivity. Currently there are no specific action plan to act as liaison between this campaign of food sufficiency and an industrial food production.

Improved infrastructures are especially beneficial for the growth of agricultural industry and based trade and, consequently, to reduce rural poverty. The technologies related to crops, food processing or manufacturing, the wholesale and retail sales are the key to an improved agriculture. And they can lead to the production of important non-food agricultural products such as biodiesel, pharmaceutical and chemical products.

The results obtained in the field of scientific and technological production are scarce, such as the technologies extension system to the field, in collaboration with NGOs in the field for the spread of improved seeds and information. Thus,

the contribution of NGOs for rural development, officially recognized as crucial, must continue to play an active role in the short and medium term.

The weaknesses in the fishing industry include the lack of port infrastructures and equipment for unloading cargo to land, the weak capacity for construction and the maintenance of fishing equipment and the insufficient knowledge of business management. There is also a concern about the levels of fish stocks in the future, due to over-exploitation of resources, environmental degradation caused by extensive oil and gas activities, and climate change.

Angola is currently on its way to the implementation of the principle of sustainability of natural resources in the sea, islands, coastal zones and their borders. This kind of activity requires a greater disclosure to have more strength involved and synergies of the company.

### **Telecommunications and Information Technologies**

Much has been achieved in this area. Competition within the sector did expand the network; it led to the use of new technologies and improved services. The sector is oriented to the companies and has rapidly increased its absorption capacity. It benefits from massive government investment in physical infrastructure and research and vocational training.

In order to sustain this growth, parallel efforts should be made to build a capacity ranging from engineering services for maintenance and repair of instruments, training and consultancy services, software development and provision of Internet services.

These areas offer good opportunities for business development, particularly for engineers and people with a degree in technology. Two areas of business opportunity and employment must be observed in this sector: the accumulation of knowledge and experience in technology licensing, and the potential to build capacity in manufacturing of products related to telecommunications.

Possible barriers to progress, however, may arise during the implementation and

interventions, as identified in the various documents of the Executive related to the National Development Strategy for Angola. Difficulties in progress, such as inadequate human capital resources and unreliable supply of electricity, are long-term issues that must be solved and that probably impede the success of other short-term objectives.

### **Industry, Oil, Gas and Mineral Resources**

After the independence, the oil and mining sector were the main contributors to GDP. For the last five years, other sectors of the domestic industry are experiencing a significant growth. Compared with the early years of this century, currently the industry sector has increased significantly its share in national GDP. However, the desired levels have not been achieved yet, taking into account the role reserved for the industry in the development of the country.

The greater weight of foreign investment in Angola is concentrated in the oil sector, characterized by geographically isolated enclaves with limited expansion or interconnection to the local industry. Due to the weak linkages with national firms, the low proportion of joint ventures and relatively slow movement of labor, its impact on technology transfer and technological learning has been limited.

Angola is rich in minerals, especially the production of rough diamonds, and with its 6% of total exports, is the second largest revenue after oil. However, the global economic crisis, registered in 2009, caused a sharp drop in diamond mining activity and in other mining sectors.

The oil and diamonds exploitation is likely to cause environmental damage in the sea and in rivers and associated terrestrial ecosystems, which undermines the clean development that is intended, although environmental initiatives have been observed in oil exploitation, more than in diamond production and in the extraction of other minerals.

## Health

The health condition of the Angolan population is characterized by a low life expectancy, high rates of maternal and infant mortality, high burden of contagious diseases and increasing chronic and degenerative diseases as well as premature mortality in general.

The answer to the demand of health care is characterized by the limited coverage and poor access to quality services.

To meet this huge demand, the country, through the health sector, showed considerable efforts over the last two decades, so that we observe a significant growth of physical health, equipment and human resources.

The health sector is one of the most absorbing technologies from outside the country, which could lead to improved diagnosis and diseases treatment. However, it would be better if the training component of human resources were strengthened and if there was a greater co-ordination of activities of various projects and programs.

As a consequence of poor interagency collaboration, we can be wasting a great opportunity to seize the benefits resulting from teamwork.

One of the weaknesses of the National Health System is the lack of uniformity in the collection of epidemiological data and surveillance means needed to monitor and tackle the spread of existing diseases, as well as resurgence of controlled diseases. The results of the demographic and health survey of 2006 may be the key to an effective public health planning and for an appropriate service response.

In most cases, there is a lack of exploitation of the great amount of scientific data produced in the day-to-day health network at all levels, and that is likely to generate knowledge. The lack of systematic data hampers the possibility of collection, consolidation and subsequent implementation and publication of scientific papers of high significance.

The long-term planning STI needs (especially after 2015, when the current contribution of donors and the import of health technologies must reduce), doesn't

seem to be a priority.

The contribution of S&T would be of great importance in the areas of information systems, epidemiology, laboratory diagnosis and diseases treatment.

## Water resources

Although it is considered that Angola is in possession of vast water resources, the water potential is not known for sure, due to the lack of proper studies. The lack of these studies also limits reliable data collection on water quality in the various constituents of this valuable resource.

Objectively speaking, it can be stated that one of the conditions for carrying out such studies is the availability of professionals in this area. Angola has few professionals with specific training in the assessment and management of water resources.

Another aspect that raises the attention has to do with planning the edge of the rivers of Angola. Populations live along the rivers, due to the need to take advantage of this proximity, which has caused permanent water contamination and watercourses erosion.

The issue of watercourses management is alarming in the diamond mining areas. A survey conducted in 2007 by environment specialists observed a weak enforcement of environmental laws and environmental management plans that would contribute to mitigate the effects of degradation that the activity entails. In some cases, situations of silting of rivers have been reported, causing significant damage to water quality, biodiversity and downstream populations.

## Energy

Politics in the energy subsector are currently focused on improving infrastructure, transport and distribution of electricity from hydroelectric power. However, the implementation of development plans and integration of other sources of energy are in progress, as is the case of wind and other renewable energies. Learning

opportunities gained from large-scale public investments in these areas have been lost, largely due to the weak capacity of absorption.

The electricity sector is regulated by the Regulatory Institute of Electricity Sector (RIES), which estimates that only 30% of the population has access to electricity. Current policy requires both the rehabilitation and expansion of the network, such as the promotion and use of renewable and alternative small scale and independent energy sources.

A major difficulty regarding planning, both for the rates conception and the promotion of investments in the sector, results from the lack of statistics on production, supply and demand of energy.

## **Environment**

During the last five years, the number of scientists and organizations dealing with biodiversity to make specialized studies increased significantly. Which has contributed to the creation of local capacities in terms of inventory and assessment of the real value a given ecosystem service can provide.

Currently activities or studies that should contribute to the revitalization or resizing of national parks or establishment of and sensitive areas, particularly in relation to coastal areas, estuaries and rivers, are in progress. However, studies for environmental monitoring are still incipient, particularly those seeking to establish the real impact of climate change.

Although the governing body of environmental policy prioritizes the work with environmental organizations and included environmental matters in school curricula, the change of daily behavior in general population did not occur yet, whether in the waste treatment or leisure areas.

This is a critical aspect in urban areas and is becoming more acute in places like the suburbs of Luanda, where poor basic sanitation (dump garbage in drainage ditches, the lack of networks for the water collection resulting from the household, etc.) may be contributing to the degradation of public health.

The lack of statistics data in this area is more visible now and the implementation of the existing environmental laws must be regulated and supervised more closely.



### 3. NATIONAL POLICY FOR SCIENCE, TECHNOLOGY AND INNOVATION

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The National Policy for Science, Technology and Innovation is the set of goals that are consistent with the Government's Program in the STI area, serving as a regulatory instrument for its implementation.

Given the framing done for the National Policy for the STI now three key aspects can be clearly defined to its application: Vision, Mission and Goals.

### 3.1. Vision of the NPSTI

The vision for the development of Science, Technology and Innovation in Angola is the inclusion of science, technology and innovation in the Country Development Strategy so that in a long term a society of knowledge is built up, whose attributes serve as determinants combating poverty and improving living conditions of citizens in harmony with nature.

### 3.2. Mission of the NPSTI

The National Policy for Science, Technology and Innovation (NPSTI) is the central instrument for in a sustainable manner and in line with the fundamental interests of the population, the state and organizations, contribute to the implementation of the Angolan National System for Science, Technology and Innovation, in order to become a reference in the African continent. This system converge to international best practices and is recognized for the quality of the results produced and the impact that technology transfer processes and knowledge will have in leveraging the economic and social development of the country, the resolution of structural problems of economy, management and efficient use of natural resources and maintaining the security and sovereignty of the Angolan state.

### 3.3. Goals of the NPSTI

The National Policy for Science, Technology and Innovation (NPSTI) sets guidelines so that science, technology and innovation have a greater impact on the fundamental pillars of the national economy and contribute effectively to

human development (of Angolans) the strengthening of national sovereignty and the affirmation of Angola in regional and international context.

The NPSTI sets targets according to the vision and mission for building a knowledge society, where science and technology and innovation are crucial to combat poverty and improve the quality of life of citizens in harmony with nature, towards a sustainable socio-economic development.

The goals of the National Policy for Science, Technology and Innovation are organized in three main pillars:

- Organization and Development of the National System for Science, Technology and Innovation;
- Contribution of Science, Technology and Innovation for the Sustainable Development of Angola;
- Funding of the National System for Science, Technology and Innovation.

#### 3.3.1. General Goals

##### Organization and Development of the National System for Science, Technology and Innovation

The development of NSSTI is based on four essential components: highly qualified human resources; institutions with proper means and conditions for the performance of research, development and innovation, national, regional and international networks and exchange processes that enhance access to knowledge and a legal and organizational framework that promotes the achievement of results.

The NPSTI is governed by the principle of excellence and quality of strategic importance since it directly affects the impact of investments in R&D and by the premise of responding to society's problems.

The positive attitude towards knowledge is one of the most important premises for

the success of all members and concomitantly the NSSTI, so it is essential that the zeal with which this attitude is assumed, for the establishment of high-level and stable scientific capacity.

### **I. Qualification of Human Resources**

The promotion of training of human resources is to ensure the development of man, the foundation for building a knowledge society, the basis for national socio-economic development, in order to meet the challenges of science to satisfy the current needs of society and meet the yearnings and aspirations of future generations.

The strengthening and training of human resources capable of supporting the building of a knowledge society must go through an investment in technical, technological and advanced formation (specialization, master, doctoral and post- doctoral degrees) in order to reinforce the institutions of higher education, research and technological development, with emphasis on major areas of the National Policy for Science, Technology and Innovation.

### **II. Creation and Reinforcement of the Material Basis**

The creation and reinforcement of the capacity of Higher Education and Research Institutions are performed through the edification of infra-structures, creation of libraries, acquisition of equipment and bibliographic acquires, local and national, as well as access to online libraries.

The reinforcement of the material basis is important to establish a network and improve the performance of research teams and the consequent production of knowledge. This investment must be made to all areas, with emphasis on those with the higher incidence of NPSTI.

The restoration, maintenance and conservation of scientific and technological patrimony (bibliographic acquires, research materials, library and physical facilities) inherited from the colonial system, as well as everything that was acquired after

the conquest of national independence, should include actions to make a broad survey of world scientific and technological heritage of Angola, its transference, cataloging and dissemination.

### **III. Scientific and Technological Co-operation**

To ensure the exchange and co-operation between national institutions for scientific research and technological development as well as with their counterparts in a regional and international scope, it is preponderant to encourage adhesion to research networks, or their set up, as well as the establishment of bilateral and multilateral agreements.

The SNCTI must be qualified to monitor the scientific and technological development in the world scientific technological and cutting edge innovation areas. To achieve this goal, it becomes imperative to establish in our country, scientific capacity and stable high-level training of young scientists within their own social realities, and the creation of distribution and appropriation system of knowledge and technologies.

### **IV. Legal Framework and Institutionalization of the NSSTI**

The institutionalization, consolidation and improvement of the National System for Science, Technology and Innovation are aimed to achieve better coordination, articulation and synergy and complementarity of efforts of all its actors and other elements of society.

This assumption should contribute substantially to the increase and optimized use of human resources, financial, infrastructure and equipment in all institutions of higher education and research, including those used in the dissemination of scientific and technological achievements and the mass use of information technologies.

The protection of intellectual property, including traditional, should be seen as a premise, given the wealth that our country has. The initiatives should include

actions that encourage the systematization and passage of traditional knowledge from generation to generation, skills development and their enhancement.

### **Contribution of Science, Technology and Innovation for the sustainable development of Angola**

The NSSTI aims to provide answers to the Angolan society and its needs for a sustainable development in what concerns STI. These responses fall into four domains or intervention areas: raising the level of the Angolan population scientific culture, the contribution that the STI is able to respond to the social, cultural and environmental challenges at Angola, the incorporation the scientific and technological knowledge and the capacity for innovation, supporting the economic and enterprise development, the use of science, technology and innovation to support the country governance.

## **V. Promotion of Scientific Culture**

To promote and to ensure the scientific and technological dissemination aims to generalize the scientific and technological knowledge in order to elevate the general population culture of science, technology and innovation, thus accelerating the integration of Angola in the regional and international context.

The strengthening of national consciousness about the priority of research and technological innovation and confidence building and support for science by the public, should help to convince the decision-making centers and public and private companies to dramatically increase their investments in R&D and resorting systematically to scientific and technological findings in a sustained manner to implement their programs and/or actions.

## **VI. Response to issues on Defense, Security, Social, Culture and Environment**

A special place in state policies is reserved to STI, both in developed and emerging countries, due to its decisive role in economic development and because it's

considered a matter of sovereignty and independence. The investment on STI aims to accelerate and contribute to sustainable development and the consequent strengthening of the sovereignty and Independence of Angola.

For this purpose it is necessary to equip the country with human resources, infrastructures, suitable equipments for food self-sufficiency and capacity of response or intervention in case of natural disasters and epidemics, as well as preventing the effects of climate change.

The NPSTI should be based on social commitment so the production of scientific and technological knowledge match society's problems, such as advocated by the Declaration of 1999 on the use of science and the scientific output of the 1st World Forum Science, held in Budapest. This same document argues that science must promote "intellectual and moral solidarity of mankind", which is the basis for a culture of peace. Similarly, the scientific community and decision makers must seek to strengthen the trust and support of science by the public, since this is the bulwark for the establishment of solid foundations for the realization of the NPSTI.

The decision-makers and other members of society should make systematic use of technical and scientific knowledge to promote conservation and sustainable use of natural resources and to protect the environment for the balance of the biosphere and populations well-being.

The promotion of women's participation in the activities of science, technology and innovation must include various actions horn creating incentives or prizes that aim to distinguish and encourage women scientists who excel in their business.

To enhance and ensure the continuity of traditional people knowledge of the people of Angola, we should use science and technology for the systematization of the same. To this end, future studies should allow further knowledge about our flora, fauna, with emphasis on medicinal plants. We should also proceed with the creation of specialized bodies concerned with the protection, registration techniques and the dissemination of this knowledge area.

The Angolan culture should be the subject of research and publications, as well as of training of qualified staff. Through its development and consolidation we will contribute to national identity and unity and the conditions to promote the cultural

level of the general population will be created.

## VII. Economic and Entrepreneurial Development

The materialization of actions, coupled with the positive effects of other measures required in the industrial sector in general, will allow the gradual increase of both domestic and foreign investment in non-oil industrial sectors, since the brunt of foreign investment in Angola is concentrated in the oil sector which is characterized by geographically isolated enclaves and limited expansion or interconnection with the local industry.

Technology transfer is a mean of accelerating industrial development, economic and social development and as such, it should receive support for professional mobility of researchers through networks and partnerships with the productive sector or business.

The promotion of technological innovation and new products as well as the transfer of appropriate technologies and environmental issues, including clean energy, and incorporating the results of scientific research and technological innovation in the productive sector of Angola is a key objective of the NPSTI. The consolidation of this development requires the implementation of technological licensing.

## VIII. Action of the STI in Governing

The promotion of a governing based on scientific, technological and innovative principles, through enhanced integration of technical and scientific knowledge in sectorial policies and development strategies of the key areas of assessment for the NPSTI, with emphasis on Education, Health, Agriculture, Fisheries and Aquaculture, Water Resources, Oil, Mineral Resources, Energy, Defense and Security and others, to eradicate hunger, reduce poverty, increase food security and nutrition and public health, according to the Government Program and the millennium goals.

**Funding of the National System for Science, Technology and Innovation.**

## IX. Financing

Financing represents the fundamental aspect to boost the scientific and technological development with an impact on the country's socio-economic development. Thus, it's indispensable to decisively bet in the significant increase and additional captation of public-private funding for the STI with the creation of a financial instrument, to ensure proper funding and proper management of scientific research and technological innovation.

It is intended that the investments to be made will be reflected positively in the resolution of social problems and challenges posed by the preservation of natural resources and climate change.

### 3.3.2. Specific Goals

#### Organization and Development of the National System on Science, Technology and Innovation

##### I. Qualification of Human Resources

###### 1. Advanced Training

The implementation of training programs for specialists, masters, doctors, and post-doctorates, together with other specific actions shall reinforce the capacity of scientific institutions and other sectors of national life in human resources, both nationally and locally, through the specialization of investigation institutions and the reinforcement of academic freedom in the higher education institutions.

###### 2. Attraction of Country's Exterior Workers

Today, countries are developed based on internal and external resources. The current level of development of Angola requires the collection of foreign workers from the country to fulfill the wish of development. To this end, it is urgent to create conditions to attract Angolan workers and foreign brains.

### 3. Motivation of Human Resources

The motivation of human resources is the key to the effectiveness and efficiency of the functioning and sustainability of institutions. Thus, it is necessary to constantly motivate the human resources and enhance the scientific activity and technological innovation, including the harmonization of the Careers of University Professors and National Scientific Research in order to boost the research and academic exchanges with similar careers in the region and internationally.

### 4. Mobility and Settlement of Scholars and Investigators

In the recent years, there is a trend in setting frames in more developed areas, which causes a shortage of staff elsewhere in the country. The NPSTI aims the establishment of qualified professors in higher education institutions in different regions, so as to enable the quality of its operation.

The opportunities for advanced training and mobility should promote the creation of networks and break the scientific isolation.

It is important to create that conditions that stimulate staff's mobility of staff, as well as to promote the participation of national academics and researchers in national, regional and international scientific events.

### 5. Identification, Selection and Motivation of Talents

The NPSTI has as goal the identification of those who can possibly contribute for the development of STI in Angola. For such, besides the actual search for talents, it is also necessary to fit the profiles of the curriculum in science and education and turn them coherent for the young people, motivating them for scientific and technological careers.

### 6. Promotion and Creation of Excellence Centers

The NPSTI aims to set up teams with the critical mass necessary for the production of quality knowledge production, scientific and technological development and innovation, without which you can not have quality results and contribute significantly to national development.

However, it is necessary to find a balance between the need to concentrate resources for quality of the results of higher education institutions that serve the populations of different regions.

These institutions must be capable of training highly qualified workers, taking into account the challenges of society and the development of Angola.

## II. Creation and Reinforcement of the Material Basis

### 7. Qualification of Scientific Institutions

The NSSTI requires the creation of new infra-structures and recovery of the existing, endowing the scientific institutions with equipments and materials, as well as ensuring its maintenance, with emphasis on the areas of focus.

Thus, the NPSTI aims the support to charity of the scientific institutions with infrastructures, creation of libraries, acquisition of equipment and bibliographic acquires, nationally and locally to all areas of knowledge, with emphasis on the incidence of the NPSTI. The strengthening of infrastructures and the material basis should be done through partnerships or co-operation agreements.

### 8. Access to Knowledge Produced on a National Level through the Access to Online Libraries (I-on)

Scientific institutions resort to the use of information and communication technologies for accompanying in real time (online) the scientific and technological knowledge. One way to monitor the evolution of knowledge is through online

access to international and up-to-date scientific magazines with a highly scientific knowledge.

### **9. Creation of Physical Libraries**

Regardless of access to online publications, it is necessary to promote the acquisition of bibliographic acquires and creation of libraries that serve the needs of consultation of literature designed for dissemination of science and technology and to support training needs, particularly in high educational institutions higher.

### **10. Recovery and Conservation of Angolan Scientific and Technological Patrimony**

The NPSTI aims the recovery or reestablishment of bibliographic acquires of greater importance existing in the country, taken from Angola or published abroad. Thereby, has as goal the conservation of patrimony recovered and that will be produced in the future.

### **11. Promotion and Creation of Technology Parks and Business Incubators**

This activity should be carried out in a balanced way by the different regions of the country, having as objectives: the creation of technology parks that promote a culture of innovation and competitiveness in enterprises and institutions based on the knowledge associated with them, and encourage the creation of incubators that allow supporting the transformation of ideas into concrete projects that will contribute to the development of technology-based companies.

## **III. Scientific and Technological Co-operation**

### **12. Scientific and Technological Cooperation on a National Level**

The NPSTI encourages the creation and articulation of networks and centers of excellence in order to match the capacity of advanced knowledge production, with the ability of regional offer of higher education. It also aims to promote the participation of undertakings, in order to transfer technology to the productive sector.

Thus, it is intended to promote the signing of technological and scientific inter institutional cooperation and encourage the creation and adherence to national networks that facilitate cooperation in science and technology between researchers and technicians.

### **13. Exchange and International and Regional Cooperation**

Under regional and international framework, the NPSTI promotes the establishment of partnerships and participation in networks and projects relevant to the development of Angola as well as creating opportunities for regional and international exchanges of teachers and researchers.

This requires the identification of joint scientific activities with the countries of the region and the international community, as well as the signing of cooperation agreements with scientific institutions in the region and the international community.

In this context, it encourages the membership of regional, national and international clusters to increase the exchange of experiences with scientists and technicians from the region and the international community.

#### **IV. Legal Framework and Institutionalization of the NSSTI**

##### **14. Institutionalization of the NSSTI**

The institutionalization of the NSSTI aims to promote, implement, improve and safeguard the functioning of the institutions of scientific research and technological development and their actors, as well as clarify its articulation.

##### **15. Formulation of a Co-ordination Mechanism of the NSSTI**

The formulation of a coordination mechanism should help to improve the coordination and articulation of the NSSTI's actors, optimizing the use of human and material resources available to the STI.

##### **16. Dissemination of STI Indicators and other data resulting from the Assessment of Members of the NSSTI.**

The disclosure of these parameters is of vital importance to assess the impact of investment in R&D, the integration of research results in national life and consequent performance of the NSSTI.

##### **17. Carrying out activities that promote the Registry and Protection of Intellectual Property**

The protection of intellectual property rights must be considered as fundamental, while conditions must be created to ensure the principle of right of access to information and knowledge sharing. This assumption is of vital importance to the scientific and technological progress.

##### **18. Registration and Protection of Copyright on Academic and Scientific Works, including on Traditional Knowledge**

Registration and protection of copyright in scholar and scientific works, including traditional knowledge, is an essential component in the functioning of NSSTI.

##### **Contribution of Science, Technology and Innovation for the Sustainable Development of Angola**

#### **V. Promotion of Scientific Culture**

To achieve results that can effectively popularize knowledge, substantially increase the scientific culture, technological innovation and the general public while raising awareness about the importance of the STI the following specific objectives should be made:

##### **19. Promotion and Guarantee of Scientific Divulcation**

The popular science aims to achieve the goal of sharing scientific and technological knowledge and keep society informed about the research and also to raise the population's level of scientific culture, particularly through the means of mass communication and including the use of national languages.

##### **20. Implementation of Interactive Science**

Interactive science is the most powerful process to raise public awareness about the priority of the STI and facilitate access to knowledge in real time.



### **21. Systematized and Direct Communication between the Academic and Scientific Community and Society in General**

It is important to establish this communication so that academics and researchers can meet the real problems or concerns of society and realize better the work done by the scientific community.

### **22. Expansion and Use of Information and Communication Technologies**

The mass use of STI and the promotion of Internet access tend to accelerate the integration of the population, towards building a knowledge society and enable access to distance education.

### **23. Basic Science Teaching**

It is really important to strengthen the teaching of basic sciences (mathematics, physics, chemistry, and biology, information technology), from basic education to higher education as a way to motivate young people for science and technology, as a starting point for staff training that can effectively form the basis to boost the scientific, technological, industrial and human development of the whole population.

## **VI. Response to Issues on Defense, Security, Social, Culture and Environment**

### **24. Contribution for the Strengthening of Sovereignty, Defense, National Security and Civil Protection**

The NPSTI aims to promote the autonomy of national life, including specialized areas such as national defense and security through the incorporation of advances in specialized centers in the STI of the National Army and National Police, Civil

Protection Services and Fire Services, Immigration Services and Frontier and Prison Services.

Thus, it is aimed at scientific and technological capacity of institutions to comply with the constitution and scientific contribution to support state and society in general to respond to emergencies such as natural disasters.

Emergency situations can be prevented, provided that such structures aimed at making use of various sources of monitoring and data collection, particularly scientific basis.

### **25. Promotion and Guarantee of Social Responsibility of the STI**

The social responsibility of the STI is to promote the principles and attitudes, namely: the promotion of ethics, bioethics, biosafety and social responsibility, promoting the principle of exploitation of the potential of the country and the promotion of equity, diversity and social inclusion, the use of the STI for peaceful purposes.

Social responsibility is reflected also by ensuring the right to information society in general about the scientific, technological and innovation activities and the creation of conditions so that the access to this information is effective, corresponding to the expectations of citizens.

### **26. Education of the Population for the Conservation and Sustainable Use of Biodiversity and Other Natural Resources**

The conservation and sustainable use of natural resources requires changing attitudes and, consequently, the education of the population for this purpose. The members of society should make systematic use of scientific and technical knowledge to promote conservation and sustainable use of natural resources, protection of the environment for the balance of the biosphere and well-being of

the populations.

### **27. Promotion of the Responses to Emergency Situations and Effects of Climate Change**

Emergency situations require the use of technical and scientific knowledge and its systematization to be used when necessary. For its part, the effects of climate change should be investigated and be brought forward, in order to respond adequately, aiming the preservation of the population well-being.

### **28. Promotion and Guarantee of the Participation of Women in Science, Technology and Innovation Activities**

It's necessary to develop strategies and policies that facilitate the women's access to knowledge on STI and simultaneous participation of the same, fully and fairly, in all fields of scientific activity, in particular by creating incentives or awards for excellence and dedication of the scientist woman.

### **29. Promotion and Appreciation of Traditional Knowledge and Culture of the Angolan People**

Measures to ensure increased support for activities aimed at the local systems and traditional knowledge should be carried out, including its systematization, registration and protection, as well as the promotion of the dissemination and appreciation of traditional knowledge applications, including national languages.

The Angolan culture should be supported in the research area in order to consolidate and reinforce the existing knowledge, as well as dissemination activities.

## **VII. Economic and Entrepreneurial Development**

### **30. Encouraging Technological Innovation and New Products**

Technology transfer should be accompanied by an assessment of its possible impact on the populations and societies. Simultaneously, investigations in search of a clean development, such as clean energy and energy efficiency, should receive strong support from public and private sectors.

### **31. Implementation of Technology Licensing and Consumer Protection**

The introduction of technologies in the domestic market must be accompanied by their assessment and licensing, to legislate on the licensing process.

The products and services available in the Angolan market must be evaluated to allow support for the action of the institutions responsible for consumer protection, including the National Institute for Consumer Protection.

### **32. Promote the Integration of Results Achieved in Scientific Research and Technological Innovation in the Production Sector**

Conditions should be created to encourage and facilitate the integration of technical and scientific knowledge in sectorial policies and strategies for sustainable development.

## **VIII. Action of the STI in Governing**

Participation in the promotion of democracy and strengthening good governance, characterized by transparency, social equity and participatory governance, the STI must resort to the inclusion of technical and scientific knowledge in sectorial policies and strategies for sustainable development. To this end, we must strengthen the

partnership of higher education institutions and research and business and other civil society organizations.

### **33. Promotion of a Governance Based on Scientific, Technological and Innovation Principles**

The objective of the NPSTI is to provide information based on scientific evidence capable of supporting the decisions of the Executive and other bodies of state administration, as well as encouraging local authorities to a greater integration of STI in the precepts of community in the development programs, and the State shall, through the civil society organizations, promote the development and application of local techniques and transfer of appropriate technologies in community development.

### **34. Increased use of STI in Governance Actions**

The State should encourage a variety of services in the public and private sector to accelerate the computerization of its services in favor of increasing their quality and promoting greater use of the Executive's website by the political actors and citizens.

The mass use of facilities such as the Executive's portal is of strategic importance, since keeping society informed about the programs and major actions by the Executive, is a constitutional right and a government action of closeness between rulers and ruled.

**Funding for the National System for Science, Technology and Innovation.**

## **IX. Financing**

The funding of STI in developing countries such as Angola is a sensitive matter, since they must invest heavily in eradicating hunger and fighting poverty and at the same time, invest in R&D. However, there's a growing consensus that the

R&D plays an important role in promoting socio-economic development. As such, these conditions should significantly increase funding for the STI is to respond to the activities or actions aimed at strengthening the functioning of NSSTI and consequent increase in scientific and technological production that can stimulate sustainable national economic development.

To respond adequately to the financing needs of the NSSTI and carry out R&D should be made the following specific objectives:

### **35. Funding and Qualification of Human Resources**

The aim of funding is to increase quantitative and qualitative human resources to be able to operate, with quality, in the NSSTI.

### **36. Funding for Research Activities**

The aim is to effectively support the activity, the second line of research based on the Executive's Program and other priorities of the Angolan society.

### **37. Funding for Disclosure of Knowledge**

It is important to promote and ensure the necessary funding for the popularization of science so that the acceleration in building a knowledge society is effective.

### **38. Financing for the Creation and Reinforcement of the Material Basis**

The maintenance and upkeep of infrastructure and means of investigation are as important as getting them. Therefore, the allocation of funds to fulfill this aspiration should be able to create the conditions so that teachers and researchers have the means necessary for the production of knowledge.

### 39. Financing and Co-operation

The participation in networks and regional and international partnerships, as well as the functioning of national networks, requires the availability of financing so that it becomes effective and produce results.

### 40. Borrowings for the STI

The State must foment and ensure the financing of STI, as the main goal of creating conditions to attract funding, extra-budget, public-private partnerships.

#### 3.4. Focus Areas of the NPSTI

Currently, the Angolan economy is largely dependent on extractive industries, particularly oil and diamonds. The Executive (Government) has made economic diversification a priority.

The diversification of the Angolan economy through the increased levels of professionalisation of human resources involved and the strengthening of technological capacity.

The diagnosis requested by the Executive of the Republic of Angola and conducted by the United Nations, under the aegis of the United Nations Commission for Trade and Development (UNCTAD) recommends the development of science, technology and innovation in Angola, the following priority areas:

- Education, Culture and Professional Training;
- Higher Education;
- Agriculture and Fishery;
- Telecommunications and Information Technologies;
- Industry, Oil, Gas and Mineral Resources;
- Health;

- Water Resources;
- Energy;
- Environment.

### Education, Culture and Professional Training

The teaching of science faces similar problems almost all around the world. In most countries there is a glaring lack of educators and enthusiasts of science teaching. Despite the efforts seen in recent years, the incorporation of important areas of knowledge that concern the environment, public health, renewable energy, entrepreneurship and other related aspects in the curricula, needs greater attention.

Angola needs to take firm steps in the popularization of science, involving institutions of general education and university research centers, museums, media and NGOs, as children begin to gain from an early age a taste for science. A strategy to promote and support science education from primary school to higher education institutions should be adopted.

The level of scientific understanding and approach that is expected at each level or stage of education by encouraging the incorporation of these aspects and its methodology in school curricula should be clearly defined.

Therefore, the need to invest more in vocational training quality to meet the demands of the labor market in this area is topical.

One of the strategies of basic technical training and/or high average power may be the best strategic alliances with the productive sector. The subsystem of vocational technical education can take many advantages by organizing, for example, temporary internships with companies with a high potential of know-how, such as Sonangol and Endiama, so that technicians from these companies can make the transmission of knowledge in real time, participating in national education and training programs in technical and average basic vocational training.

To accomplish all this, a more collaborative approach (transversal) should be developed between the Ministry of Education and other society partners involved in vocational training.

The cultural sector in Angola has the primary responsibility of preserving and developing cultural events as a way to ensure the identity of the Angolan nation. In addition, the sector should develop comprehensive measures in the context of preservation and development of culture; develop the action in the areas of cultural heritage, artistic and literary creation of cultural action research on the history of national languages and culture; value the factors of cultural identity of the Angolan population; promote cultural values conducive to the economic and social development; co-ordinate and implement the policy of development of institutions and cultural industries; develop and ensure the enforcement of cultural policies; and promote the cultural co-operation with other countries and similar institutions.

### Higher Education

Advanced training and qualification of human resources in research is a priority for the NPSTI, which aims to accelerate the convergence of scientific qualifications of the national human resources to the levels that are observed in most countries of the region where Angola is located, in particular with regard to the post-graduate training. The training of human resources through graduate courses, should be seen as a strategy to promote research activities, strengthen the existing research teams and reinforce institutional capacities.

For this to look natural it's urgent to create incentives and centers of excellence for knowledge, which requires the implementation of a Quality Assessment System for Teaching and Research independently and free.

Advanced training programs and qualification of human resources are dealt with together between the body responsible for higher education and other sector bodies, whose function concurs so that the established targets are met, with particular emphasis on meeting the demands of the productive sector.

It is urgent that the educational and research institutions develop a training plan that sets clear goals, high levels of science (specialization) of its staff in view of the integration of research activities, increasing scientific and technological match, even better, the demands of the productive sector and society in general.

To this end, whenever possible, the training in situ (in Angola), regarding outside the country, should be cultivated. The training of scientific staff should be clearly scaled taking into account the needs for each level of training of candidates and the real institution's needs.

It should be noted that the creation of new public universities, in addition to developing training opportunities in the provinces, sparked an unprecedented process of bringing highly qualified staff to the provinces.

Still, should be taken advantage of the implementation of distance learning and throughout life, with a view to an adaptation or rapid insertion of new knowledge in the production processes.

However, without uncivil to the areas in question, Management, Economy and Law seem to be the preferred field of study by students without undermining Science and Engineering. Efforts should be made to make the higher education institutions have at least one reference area which is identified with the areas of focus of the NPSTI, seeking a quick and balanced scientific and technological growth of the country.

The education and professional training of human resources represent a priority in the training and full development of man domain. The training of engineers, technicians in the exact sciences (mathematics, physics, chemistry, information technology, biology) is extremely important in order to strengthen the institutions of research and technological development, with emphasis on major areas of the NPSIT.

The ultimate goal is that human resources outside schools and universities become a critical mass capable of driving the development and technological innovation that lacks the national productive sector.

### **Agriculture and Fishery**

The diversification of the Angolan economy requires, first of all, increased self-sufficiency, both in protein from plant and animal, which is an essential requirement to respond positively to the challenges of eradicating hunger, combating poverty and increase food security and nutrition.

According to the World Conference on Integrated Management of Oceans, Coastal Areas and Islands, held in April 2008 in Hanoi/Vietnam, to achieve effective management of the areas in question the “principle of the ecosystem” (locally, regionally and internationally) should be taken into consideration. For this it is necessary to involve all forces and social partners, particularly Local Authorities. This principle is also extensive to the management of other terrestrial ecosystems, of inland and border water.

After fulfilling the main goals, the incidence of the NPSTI on agriculture and fishery must contribute to achieve as follows:

- Implement an intensive agriculture, based on technologies that lead to an increase in productivity in harmony with the environment;
- Increase the food and nutritional safety;
- Increase the food production in a consonance with the bioethics principles;
- Create infra-structures for the production, transformation and commercialization of agricultural products;
- Encourage the use of organic farming;
- Use technologies to allow taking greater advantage of the exploitation of marine resources, ensuring at the same time, the continuity of the species and the health of the environment.

### **Telecommunications and Information Technologies**

The ICT facilitate the creation and dissemination of knowledge in innovative companies. A fundamental prerequisite for an Angolan Society of Information

is the modernization of the telecommunications sector, activity started recently.

In addition to the computerization of production processes and management bodies and the inclusion of this component in the teaching and scientific research, special attention should be given to the mass use of ICTs for the whole society.

The STI can contribute to the development of computing, including:

- Increasing significantly the number of users and computer and media communications;
- Facilitating the Internet access and related services;
- Integrating the components of ICT in teaching and national processes;
- Increasing the number of mobile phone users and improving the service provided to the consumer;
- Promoting the creation of conditions to capture the TV and radio signal of TV nationwide.

The management of the “ao” domain, similar to what happens in many other countries around the world, lies in a public entity with a strong scientific nature, as it is the case of UAN.

In this context, the normative management of the “ao” domain derived from the assumptions of technological research and innovation carried out primarily by institutions of higher education, whose direct and transversal responsibility is exercised by the governing body of the National System for Science, Technology and Innovation in the country, which is supported by the history of the development of the Internet in the world and Angola.

This tells us that the development of the Internet was due largely to the passage of management by academia on the one hand, and weak intervention by the State in its regulation on the other. However, the governing body of research policy in the country should consult with other government agencies, such as the organ responsible for Telecommunications and Information Technology.

This co-ordination is essential to adopt the measures necessary for the creation

and construction of infrastructures, as well as the adoption of all acts and measures of operation, required to operate the Internet in Angola.

In addition to the dynamic that is introduced in the use of the domain, the physical maintenance of the domain management in national territory is essential for proper development of the Information Technology sector in Angola, since the diffusion of information technology enables greater use of the domain for the sake of research, knowledge and dissemination of knowledge.

Although the management of the domain “ao” is the digital sovereign competence of the governing body of policy research and the diffusion of Information Technologies to its greatest use to the racing governing body for telecommunications and information technologies, it is the responsibility of the holder of the Executive set policy for management of top-level domain “ao” (Country Code Top-Level domain ccTLD), which is universally known as DNS (Domain Name System).

The management policy for top-level domain “ao” is made with respect for the experience of Angola and the international best practice on this matter, without neglecting the civil society consultation.

### **Industry, Oil, Gas and Mineral Resources**

FDI (Foreign Direct Investment) in Angola is concentrated mainly in the oil sector, characterized by geographically isolated enclaves due to weak linkages with domestic firms.

Nowadays, one can still find a low rate of joint ventures established, particularly with regard to the transfer of knowledge and technologies. These aspects and the question of a closer connection to the local industry should be improved.

Given its dominance in the national economy, the connection to the local industry should provide opportunities to obtain benefits from its high development in the STI.

The implementation of the objectives that emanated from the NPSIT’s vision and mission on the sector should contribute to achieving the following:

- “Angolanize” the Oil Industry, in light of the program launched in 1982;
- Invest with national means to improve the effective protection of environment, infrastructure, land and oil rigs;
- Strengthening the business of local suppliers and ensure the principle of complementarity between them;
- Expand initiatives that favor a cleaner production of oil and its derivatives.

Angola is the fourth largest producer of rough diamonds, and in the context of the Angolan economy these constitute about 6% of total exports, ranking second to oil.

Angola is also rich in other minerals that, such as diamonds, need to be explored in a rational manner so as to cause the least possible environmental damage, promoting an integrated development.

The industry must continue to take significant steps enabling the country to gradually reduce the dependence on oil and other mineral resources. At the same time, the presence of Science, Technology and Innovation within it should grow in proportion. This strategy will allow the diversification, sustained growth, revenue sources and create the necessary basis for recovery or emergence of a true industrial park, investing mainly in sectors such as manufacturing, agro-industry, fishing industry, the industry energy.

The modernization of this sector given the assumptions of the NPSIT’s vision and mission should try to:

- Focus on scientific and technological research to support specifically the sector;
- Promote the establishment and operation of quality control laboratories in business and, failing that, the emergence of central laboratories in the provinces in order to meet the needs of local industry;

- Promote multifaceted co-operation with industrial companies with HEI and R&D institutions;
- Focus on technological innovation and encourage its widespread use in most industrial companies;
- Extend to all members of the extractive industries sector the transfer of knowledge and modern technologies that enable the discovery of new deposits;
- Integrate the environmental component in all phases of exploration, exploitation and abandonment of facilities and fields of exploitation;
- Use the diamond revenues to promote staff training and acquisition of appropriate technologies to boost agro-industrial development, with emphasis on the regions where minerals are extracted.

### Water Resources

Angola is characterized by a water network that spans almost all over the country, assuming as an important world reserve precious and strategic resource.

The implementation of the assumptions of this NPSIT's vision and mission is to take the best advantage of the immense water resources of the country, satisfying the needs of the population in drinking water so important to improving public health, both in urban and rural areas.

Thus, it is expected that the NPSTI contributes to the following:

- Improve significantly the population's levels of water supply;
- Take advantage of the availability of water resources to boost agricultural production;
- Assess the potential water;
- Propose models of management and rational use of water for better planning of water resources;
- Create strategic reserves of water to counter the increasing scarcity

of the resource;

- Improve the regulation of the river shores and create living conditions for coastal populations, equidistant locations, to avoid the permanent contamination of water quality.

### Health

To better achieve the objectives of the sector it is important to bet on the prevention and to strengthen inter-institutional co-operation, both internally and with centers or referral services in other countries in the region and the international community.

The health national strategy must qualify to the reinforcement of its capacity coverage and response, investing heavily in research so that, both through conventional mechanisms as other innovative solutions, the most diverse public health situations are given adequate answer.

In this context, after reinforcing the scientific, technological and innovation assumptions of the NPSTI's vision and mission, the STI can contribute in order to reach the following:

- Improve the operation of the health care fixed network, mobile health units and community-based actions;
- Introduce cutting-edge technologies at various levels to provide health services and hospital support, aiming at substantial improvement of the diagnosis at any stage of development of the disease;
- Develop work methods of working to promote inter-institutional medical teams, in order to strengthen inter-hospital co-operation, optimize the use of available equipment, improving diagnosis and increase the chances of cure for patients;
- Adapt the sector's financing system and hospital administrative management to ensure the implementation of policies in the health sector, as well as allow the possibility to assess the impact of the programs in other health sectors and in society in general;
- Create a storage system of epidemiological surveillance and means



needed to monitor and tackle the spread of existing diseases and the resurgence of subsidiaries;

- Encourage research in Health Sciences in general and in particular traditional medicines;
- To promote greater integration and complementarity between the conventional medicine and traditional.

## Energy

A more reliable and affordable supply of energy to a wider geographical area could sustain the growth of agro-industry. Vast opportunities for the application of STI technologies and ownership can be a reality with the expansion of the national grid, the construction of dams and the use of renewable energy.

Investments for the development of alternative energy can be obtained from the income of industry such as oil and diamonds.

Another essential element to consider is the increased public awareness of the need for further rationalization of energy consumption, so the system can meet the energy needs of more consumers.

The introduction of rules and regulations governing energy efficiency technologies and equipment manufacturers should be a bet for the profitability of conventional electricity grid, and the development of alternative or renewable energies must at the same time, be prioritized.

Thus, the STI can contribute in order to reach the following:

- Improved transport and distribution of electricity;
- Improved management of electrical energy consumption;
- Hydroelectric development, including mini-dams;
- Integration of alternative energy supply in the national network.

## Environment

The focus on environmental education should be intensified and the results of their actions should be mirrored in statistical numbers to measure, more appropriately, on a behavioral change in society, improving the environmental conditions and impact on public health.

This activity must be accompanied by studies and environmental monitoring activities to establish the level of contamination of effluent water in rivers and on the domestic network, beaches and other places of leisure, in short, the pollution of residential areas.

Similarly, one should devote special attention to the establishment of quantitative and qualitative figures on the impact of climate change to take measures concerning the adaptation and mitigation of its effects.

Thus, the NPSTI should contribute to the following objectives:

- Promote biodiversity conservation and sustainable use of natural resources;
- Promote clean development (renewable energy, reducing carbon emissions, etc.);
- Assess the level of pollution of residential areas and ecosystems;
- Promote the principle of ecosystem management to ensure sustainable exploitation and conservation of natural resources in terrestrial and aquatic ecosystems;
- Conduct studies to establish the real impact of climate change.

## 4. INSTRUMENTS AND MANAGEMENT OF THE NPSTI

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#### 4.1. National System for Science, Technology and Innovation

The National System for Science, Technology and Innovation, defined as a set of national scientific and technological resources-human, financial and institutional activities involving the creation, dissemination and application of knowledge, is recognized as an instrument of vital importance for the development of the country.

The main function of the National System for Science, Technology and Innovation is to integrate all the elements involved in scientific research and innovation.

Are part of the National Science, Technology and Innovation (SNCTI), and their area of action, which are dedicated to scientific research, technological development and innovation, as well as their respective scientific and technological potential and innovation, linked via its own mechanism, coordinated by the Ministerial Department responsible for Science, Technology and Innovation Policy.

In Angola, with the creation of the previous General Studies and the Research Institutes in the sixties, the beginning of operation of this system was formalized.

This system has become increasingly dynamic, contributing to solve problems through research programs and specific projects, especially projects in agriculture, for example, the case of maize in the Central Highlands and the manufacture of vaccines for animals, this last one was an important reference for Africa.

Today, with the new challenges of national reconstruction and promotion of national production, the system must increase and improve their coordination to meet the needs of the country. This effort must be guaranteed by a significant improvement and optimization of increasing human and financial resources, infrastructure, and coordination and improving the coordination between the various Ministerial Departments, educational institutions, research and public and private enterprises and other civil society partners.

Public and private technological research and innovation institutions, including Universities, small and medium companies operating in the area of scientific research and technological development are part of the National System for Science, Technology and Innovation (NSSTI).

The new models of transfer of knowledge generated in universities, based on the creation of university consortia that are intended to stimulate groups of young entrepreneurs in enterprises incubators, have provided excellent results in innovation and competitiveness.

The emergence of technology parks that fit more their philosophy, based on the interaction with institutions of higher education and research is also an element that makes the NSSTI larger and more comprehensive.

In Angola, the higher education institutions work to include in their development programs models and infrastructure described in the preceding paragraphs.

The complexity that NSSTI acquires, requires a better structure (improvement) of the same, a fundamental element for the establishment of co-ordination mechanism of the system.

The improvement of NSSTI is an important assumption, since it allows us to strengthen the national autonomy and overcome the technological gap. For this, we need to harness all of the installed capacity in terms of education, research, technological development initiatives or technology and innovation transfer, it is important that, where justified (at national, sectorial, local, etc.), councils or local authorities aimed to look into aspects of S&T are implemented, for example, improving the lives of people, access to new technologies, the incorporation of advances in biotechnology, monitoring of biosafety, bioethics and ethics in research. We should do likewise in relation to genetically modified organisms, drugs, chemicals and agro-chemicals, and environmental and technological impacts.

#### 4.2. National STI Strategy

The National Strategy for Science, Technology and Innovation (NSSTI) aims to establish ways and means for attaining the objectives of the Executive (Government) in the short and medium term, in accordance with the vision and mission of the NPSTI.

The NSSTI is complementary to the NPSTI and will be governed by a separate

document.

### 4.3. Coordination Mechanism of NSSTI

In general, the Coordination Mechanism of the National System for Science, Technology and Innovation (CMNSSTI) aims to strengthen coordination and to improve the link between different agencies or institutions that are part of the NSSTI.

The CMNSSTI aims to increase productivity and efficiency of the NSSTI, making it dynamic and with quality, contributing to and strengthening the scientific research and technological innovation.

The CMNSSTI should establish principles and rules on supervision of institutions for scientific research and technological development, financing and securing the management of state budget funds allocated to the sector “Science and Technology”, that aim at the optimization of available resources and means and the efficiency increase of NSSTI.

The implementation of the National Policy for Science, Technology and Innovation, is monitored and evaluated within the Coordination Mechanism of the NSSTI, through specialized agencies of MHEST and the decision-making bodies to various levels (local, sectorial and national).

The annual assessment allows to determine the progress and difficulties encountered in implementing this policy. Every two years Indicators of Science, Technology and Innovation should be published, as part of the process of monitoring and evaluation, which allows, in an objective way, the measurement of the overall impact of investments in R&D in scientific production and technological innovation.

The CMNSSTI will be governed by a separate document.

### 4.4. Indicators of STI

The NPSTI sets out the establishment of the main Indicators of Science, Technology and Innovation (ISTI) to ensure the monitoring of this activity by the Executive and assess, objectively, the results of the NPSTI and the impact of investment done, particularly in relation to scientific and technological production and to its the integration in the productive sector and society in general.

The ISTI is also an indispensable tool for placing Angola in the ranking of scientific and technological development at a regional level and in the international community.

The collection of indicators of STI should be guided by internationally accepted methodological principles in order to make a comparison with other countries. However, each country has the freedom to include an additional title, which is specific to their reality.

In order to standardize the ISTI's process of preparation, Angola joined in 2004 the initiative of NEPAD, which adopted the methodological principles established by UNESCO.

The collection of ISTI should be done periodically and systematically, and the principles of participation (rights, duties and obligations) of the members of NSSTI should be determined or regulated by a separate document.

### 4.5. STI Data Policy

The development of a STI Data Policy (STIDP) derives from the need to promote, stimulate and regulate the exchange of data and scientific and technological information, particularly at this stage where there is a pressing need to encourage research and inter-institutional cooperation.

The creation of research networks, based on the principle of effective co-operation or collaboration, can be the basis of multidisciplinary integration and increase the successful implementation of research projects.

Angola is almost in a privileged position, since R&D are in an early stage of their real development which, in principle, removes the burden of overlapping and the conflicts of interests in the establishment of principles and rules for managing and sharing data and information produced over time.

The STI Data Policy will be governed by a separate document.

## 5. NPSTI AND THE NEW CHALLENGES

It is important that on a regular and systematic basis, a review (diagnosis) on the science, technology and innovation is done, taking into account the views of all sectors of society involved, in order to shape strategies for the country's socio-economic development on the short, medium and long term.

In addition to the current concerns of society, science, based on knowledge accumulated over time and technological advances, should also qualify to be responsive to the desires of future generations and the resulting negative effects of climate change, endemic diseases, natural disasters and other concerns such as environment protection, conservation and sustainable use of biodiversity and other natural resources.

Among the natural resources, special attention should be paid to the issue of water, given its strategic importance, particularly for the next year. The population must be educated to rationally use this valuable resource and the State is called upon to develop efforts for its integrated management and rational use. It is a huge challenge now performing tasks in terms of land use, watershed management and groundwater in the name of preservation and/or improvement of the quality of this valuable liquid.

Another great challenge for science is to strengthen public awareness of the priority of research and convince decision-making centers and public and private companies to dramatically increase their investments in R&D and the defendant, in a systematic way, the scientific and technological findings in a sustained manner to implement their programs.

Efforts should also be in order to overcome the stereotypes generated by the need to obtain immediate results, so that in the developing countries, there is a tendency to focus more on applied research rather than the fundamental.

Statistics presented at the 12th Annual Meeting of the CSTD (United Nations Ad Hoc Committee of Science and Technology for Development), held in 2009 in Geneva/Switzerland, and the 1st National Conference on Science and Technology of Angola, held in the same year at Luanda, show that, contrary to popular belief, the greatest amount of scientific knowledge and patents in the world comes from basic research.

In this context, it is plausible that the implementation of NPSTI will contribute to the creation of conditions that make possible to bet as much in basic research as in applied, in order to promote a balance between long and short term, between knowledge production and its contribution to the resolution of concrete problems.

The 4th World Forum held in Budapest in November 2009, and took stock of 10 years in the world of science, since the issuance of the 1999, found that scientific progress depends heavily on the relationship between science and society and emphasizes that the recognition of the importance of STI society becomes evident when scholars, scientists, engineers and technicians are seen by her as individuals who actually work to solve their problems.

The definition of guidelines on R&D must be accompanied by an efficient system of monitoring and evaluation of all members (individuals and legal persons) of the National System on Science, Technology and Innovation. The bodies at a national, sectorial and local level should develop capacity to integrate or, in a coordinated and articulated, participate in formulating and implementing effective policies in the field of STI.

The promotion and funding of science, technology and innovation in developing countries such as Angola is a quite sensitive matter, since at the same time it must invest heavily in R&D, one must have as its central objective the eradication of hunger and the combat against poverty. However, a growing consensus that the S&T plays an important role in promoting socio-economic development. Hence, the commitment to contribute with scientific and technological solutions to efforts for eradicating hunger and poverty reduction.

The key role in the financing of science in countries like Angola must be assumed by the State, without losing sight of the involvement of other forces in society.

The support of society can serve as a catalyst that promotes the significant increase and additional capture of funding for STI to ensure minimum investment of 1% of GDP recommended by SADC, or 2% higher levels as recommended by the 1st National Conference on Science and Technology, held in Luanda in 2009 by MINSIT in order to achieve more ambitious levels of development in a relatively short period of time (10 years).

The optimization of the scarce financial resources for scientific R&D, ensuring they are effectively applied to programs or projects of scientific and technological research, is quite a challenge today. The most varied bodies should adopt a spirit of co-operation so that the spraying of skills, resources, means and initiatives to be won.

At the same time, it is urgent to take measures to remove constraints and enhance the motivation of investigators and technicians to support research for policies and research programs designed to be implemented more effectively. Other conditions should be created for scientific activities and technological development to be fully profitable, impacting on the domestic production and promote sustainable national development.

In the recent past, the country had virtually no industrial park. Now the industry grows every year, therefore science and technology are called to support increased production of this sector. Efforts should be made clear that knowledge-generating institutions (institutions of higher education and research) will help to stimulate innovation, creativity and technology transfer, adapted to our reality, to the national productive sector.

This is key because, with the growth of the industrial park in the country, the risk should increase the use of natural resources (flora, fauna, water, minerals), increasing the level of threats to biodiversity and aggravating the environmental situation in its whole.

Therefore, from this point of view, the use of research is important. Bodies dealing with environmental matters are called to rely increasingly on science to seek a diagnosis and more efficient solutions on the state of flora, fauna, water resources, minerals and other, as well as to produce quantitative and qualitative data on the real impact of population pressure and climate change.

The transfer of technologies, both intermediate and high-end, should receive an evaluation phase, adaptation and introduction in order to avoid waste and to fully exploit the equipment.

The platform for national reconstruction could be used as a basis for technology transfer and the launch of a national base for technological innovation.

TIS, as the backbone of an efficient information system, have been brought to public service, but the implementation of a strategy for TIS will require experience and knowledge, not least in the area of STI policy.

The diplomatic perspective of science should be encouraged, since it is a factor of unity, promoting social peace and rapprochement between people. For this reason and for being unanimously considered an STI factor for scientific and technological development to apply to any modern society, the S&T must be a State policy and strengthening of regional and international cooperation.



## 6. CONCLUSION

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The NPSTI is the basis for the functioning of the Executive in the field of STI, under the country's National Development Strategy. Thus, its effective implementation should ensure the production and dissemination of knowledge and technological development and innovation, in order to boost domestic production, eradicate hunger and fight poverty, helping to eliminate delays and promote structural diversification of the national economy.

The NPSTI also aims to promote the strengthening of overall coordination and joint initiatives in science, technology and innovation, and encourage the widest participation of diverse actors at all levels, facilitate social dialogue and consultation, participate in the mobilization of funding and promote synergy in the overall efficiency of scientific and technological development.

The NPSTI is an instrument created to enable the conditions of work and research support so that the activity cultivates the prestige that it recognizes and science is actually seen as a key area of government policy, both in terms of governance and affirmation of Angola in the context of nations.

The National Policy for Science, Technology and Innovation is ultimately the foundation on which rests the National Strategy for Science, Technology and Innovation and Co-ordination Mechanism of the National Science, Technology and Innovation, the subject of additional documents.

The President of the Republic, JOSÉ EDUARDO DOS SANTOS.

