

**NEW DIRECTIONS FOR NAMIBIA'S SCIENCE AND  
TECHNOLOGY SECTOR**

**TOWARDS A SCIENCE AND TECHNOLOGY PLAN**

**REPORT**

**Submitted to UNESCO and the Government of the Republic of Namibia**

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## List of Acronyms

CIET	Centre for Innovation, Entrepreneurship and Technology
CRII	Council for Research, Industry and Innovation
DRFN	Desert Research Foundation of Namibia
EPZ	Economic Processing Zone
FDI	Foreign Direct Investment
VAP	Value Added Product
GDP	Gross Domestic product
GNP	Gross National Product
GoN	Government of Namibia
GRN	Government of the Republic of Namibia
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ICT	Information and Communication Technology
IK	Indigenous Knowledge
IPR	Intellectual Property Right
MHEVTST	Ministry of Higher Education, Vocational Training, Science and Technology
MRCC	Multidisciplinary Research and Consultancy Centre
NGO	Non Governmental Organisation
NDP	National Development Plan
NEPRU	Namibia Economic Policy Research Unit
NPC	National Planning Commission
NRST	National Research, Science and technology
NSP-DFST	National Strategic Plan Development Framework for Science and Technology
NSPST	National Strategic Plan for Science and Technology
NWG	National Working Group
PoN	Polytechnic of Namibia
R&D	Research and Development
S&T	Science and Technology
SME	Small and Medium Scale Enterprise
SMI	Small and Micro Industry
STI	Science, Technology and Innovation
SWG	Sector Working Group
TTC	Teacher Training College
UNAM	University of Namibia
UNDP	United Nations Development Programme
UNESCO	United Nations Education Scientific and Cultural Organisation
V2030	National Vision Twenty Thirty
VTE	Vocation Education and Training
VTI	Vocation Training Institute

## **1.0. Introduction**

1.1. Namibia's national development strategy is embedded in Vision 2030 whose key aspiration is to rapidly transform itself into a high income, more equitable and knowledge-based economy. The broad goals of the strategy are to accelerate economic growth and social development, eradicate poverty and social inequality, reduce unemployment and curb the toll and excesses of HIV/AIDS. Namibia's aspiration and her development strategy will entail a rapid development of a knowledge and innovation system comprising educated and skilled manpower and an effective scientific and technological base capable of supporting the development of knowledge based technology driven industries, constant generation of new knowledge, and the creation of technologies for higher value added productivity.

1.2. The urge to reform her economy is motivated on the one hand by the need to accelerate economic growth and partly by realization that future economic competitiveness will be driven by enhanced capacity to apply knowledge generally, and in particular scientific knowledge and technology, to improve productivity and increase the value and variety of products from the country's key economic resources. Notwithstanding the favourable investment environment and mineral-based natural resource base, Namibia lacks a policy framework and strategy for developing a solid research, science and technology base to meet the challenges of higher value added productivity.

### **Origin of the Mission**

1.3. The Government of the Republic of Namibia has increasingly recognized that research, science and technology will be a key component of the knowledge economy and a systematic approach to knowledge and technology development will require a long term strategy integrating various role players in the creation and application knowledge and technology for the knowledge economy. An initial step towards developing the strategy for research, science and technology was made in 2004 when Government enacted the Research, Science and Technology Act that is in the process of being operationalised.

1.4. The Government considered it appropriate to embark on developing the strategic plan for science and technology development as part of its national development plan. The objective was to restructure and strengthen research, science and technology to target its services more at national development objectives.

1.5. The Ministry of Higher Education, Vocation Training, Science and Technology requested the UNESCO to provide technical assistance to conduct an exploratory fact-finding mission in preparation for the formulation of a strategic plan for the reform and investment in science and technology for Namibia's national development. The Strategic Plan will be the framework for bringing together all the players to define the

specifications of S&T investment and their delivery modalities for economic development.

### **Terms of Reference**

1.6. Terms of reference for the exploratory/fact-finding mission were to:

- collect detailed information and data from selected National institutions to be visited such as the National body responsible for economic planning, Ministry of Education, selected scientific institutions, on the development priorities of Namibia, particularly the demand on the Science and Innovation System and on the roles of key stakeholders in the system;
- undertake consultation with the senior officials of the relevant ministries and the organized private sector bodies on the process of formulating national strategic plan for Research and Innovation, based on the recently passed Act on Research, Science and Technology
- submit to UNESCO, for approval, a report of the above-mentioned activities with specific recommendations (including pilot projects identified and the training of Namibians who will participate in developing the Plan), to be transmitted to the Ministry of Education, and a work plan and budget for the next activities.

### **Methodology and Approach**

1.7. Data from which this report is prepared was collected from literature and interviews. The minimum information to be collected and key institutions to be consulted were identified together with the Directorate of Research, Science and Technology.

### **Scope of the Mission**

1.7. The scope of the mission covered extensive review of information on Namibia's national and sector-based development strategies, the human capital and knowledge development strategies and the national research, science, technology and innovation system. The review was meant to prepare for an in-depth analysis of the research, science and technology system and the development of a comprehensive and integrated national strategic plan for Namibia's science and technology development.

### **The National Research, Science and Technology Policy**

1.8. In line with national development goals and Namibia's economic policy directed, inter alia, to promoting GDP growth, the research science and technology policy will facilitate the achievement of these goals by promoting the environment and productive factors for S&T intervention in the production of goods and provision of services both in the public and the private sector.

1.9. Investments in the S&T sector will seek to strengthen the national S&T system and its capacity to carry out and deliver the results of scientific research for technical

applications, harness and make optimum use of the rich natural resources, advance indigenous small and medium scale enterprises through intense technological innovation programmes and synergistically link them to institutions and firms that can enhance their production capacity and production of value added goods and services. The policy seeks to address gender balance and full participation and integration of women in developing, using and applying science and technology, promote the development and application of traditional and home-grown technologies in small, micro and informal sectors, advance the use of S&T information, improve the environment and conditions of the science and technical professions, and enhance productivity and innovation in new products and processes. Through these measures, Government expects science and technology investments to stimulate scientific knowledge and innovation and the generation of new economic activities of high durable value.

## **2.0. General Features of Namibia**

2.1. The Republic of Namibia was established when the country attained political independence on March 21, 1990. It has 13 administrative divisions namely: Caprivi, Erongo, Hardap, Karas, Khoma, Kunene, Ohangwena, Okavango, Omaheke, Omusati, Oshana, Oshikoto, Otjozondjupa.

2.2. The country has a land area of 842,000 sq km and is bounded by Angola in the North and South Africa along the South Atlantic Ocean and Botswana in the east. It is situated between latitudes 17° 30' South and 29° South and longitudes 12° East and 25° East. It is mostly high plateau and generally arid with prolonged periods of drought. The climate is hot and dry with sparse and erratic annual rainfall averaging 20mm along the coast and over 600mm in the northeast mainly in the Caprivi region. The country is characterized by the Namib desert along the west coast and Kalahari desert in east along border with Botswana.

2.3. Namibia has a population (2001) of about 1,830,330 with a density of 2.1 persons per sq km and a growth rate of 2.6% per annum. Fifty two percent of the population are females. Estimated percentage ratio of urban to rural population is 33:67. The literacy rate for persons over 15 years of age is approximately 81%. The population currently attending school is estimated at 34%. Of the number of children who have reached school going age, 84% girls and 80% boys are attending school. 13% of the population are under five years of age, while 26% are between 5 and 14 years and 52% are between 15-59 years.

2.4. The country's economy is heavily dependent on mining which accounts for 20% of GDP. Her major exports mainly to United Kingdom, South Africa, Spain and Japan are from her natural resource base that include diamonds, copper, gold, zinc, lead, uranium, lead, tin, lithium, cadmium, zinc, salt, vanadium, marble, iron ore as well as cattle, processed fish and karakul skins. There are suspected deposits of oil, natural gas and coal. Namibia is ranked fifth and sixth world's largest producer/exporter of diamonds and uranium. The national GDP for 2004 was estimated at N\$14.76bn with per capita GDP placed at N\$4959 (1997) with contributions of 15%, 20% and 65% from agriculture,

industry and services respectively. GDP real growth rate (1997) was estimated at 1.8% while the GDP per capita growth (1997) was approximately 1.3%. Despite this huge mineral based economy, farming (crop and livestock) constitutes a sizeable (28%) source of income. Fifty percent of the population depends for their livelihood on largely subsistence agriculture. Other major sources of income are wages and salaries (41%), non-farming business (9%), cash remittances (6%) and pension (11%).

2.5. Unemployment in Namibia is rising. Based on total population the rate rose from 19% in 1991 to 35% in 1997 but fell to 31% in 2001. As percent of the work force, unemployment reduced to less than 5%. Measures adopted by GRN to curb unemployment include community owned skills development programs that offer training to out-of-school youths in living skills related to potential employment and income generating opportunities in the local economy. It is conceived that this will create employment opportunities and contribute to alleviation of poverty in disadvantaged communities.

2.6. Namibia's agricultural base is limited. The arable land area is only 2%. The major agricultural commodities are millet, sorghum, groundnut (=peanut), livestock and fish. Permanent crops and permanent pastures occupy 1% and 45% respectively while forest and woodland occupy 22%. The irrigated land is approximately 120 sq km and land allocated to other uses is about 31% of the total land area (1998).

2.7. Manufacturing and the service sectors constitute 80% of the country's GNP. Processed goods (largely mineral products) account for over 70% of total exports. Other manufacturing enterprises include meat packing, fish processing, dairy and mining.

2.8. The country has quite good infrastructure establishment consisting modern telecommunication, road and rail network. The urban telecommunication system and rural communication services between major towns are good with microwave radio relay links. Connections to other populated places are by open wire and automated digital network. There are over 160,000 fixed telephone lines providing for more than 10 people per telephone.

2.9. Emphasis in the education sector is on quality improvement by improving the education system's capacity to contribute to knowledge and innovation. Improved quality of education and vocational education and training (VET) systems will provide trainable manpower to enable industries to push the knowledge and technology frontier.

### **3.0. Namibia's Science Technology and Innovation System**

3.1. The NDP2 acknowledges Namibia's comparative state of underdevelopment of its science and technology sector despite the country's excellent environment and resource base to attract and retain a wide range of technology-based investments and value adding innovations.

3.2. The STI system comprises 42 S&T research institutions most of which are located in urban centers with satellite facilities in rural centers. The institutions, 75% of which are public funded and engaged in public good research, are concerned about the promotion, creation, application and regulation of S&T and innovations. They comprise institutions engaged in policy design and management, national and sector S&T planning, R&D and innovations at different levels in the public and private sectors including NGOs, higher education and learning and research, regulatory activities and standardization, and regional and international S&T development agencies. Private sector-based research and its contribution to GDP are difficult to establish mainly because they are predominantly associated with enterprise production operations and kept as industrial secrets. NGOs are significant contributors in the national S&T system as are the major utility-provider parastatals in the energy, telecommunication and water service sectors. Apart from the mainstream stakeholders, Namibia has other stakeholders including the legislature that determines the national development direction and are policy designers and policy makers, economic and development planning institutions that are the architects of the economy, S&T managers and supervisors, knowledge, technology and innovation generators in the R&D sector, S&T regulatory organs that are responsible for quality and standardization, industry and enterprises that are central in the application of STI for production of goods and services, technology promotion and marketing agents and regional and international sources of knowledge and technology.

3.3. The system is conspicuously fragmented with R&D institutions scattered in different ministries and departments and in semi-autonomous institutions that have own legal mandates. The institutions execute their functions in isolation; their mandates and research programmes/activities lack harmony and the coordination among them seems to be not well developed. This stems from the way S&T has traditionally been coordinated by individual Ministries. Because of this, there are policy inconsistencies, structural and product delivery anomalies, overlaps, competition for resources and uncoordinated research planning. While the institutions have strong vertical linkages they have weak or non-existent horizontal linkages to ensure standardized and timely delivery of research information, knowledge, science and technology to the enterprise sector and innovators. There is need for deliberate effort to focus their collective product delivery in a predetermined manner to positively impact the economy. Consequently, Government has enacted the Research, Science and Technology Act 2004 that established National Commission for Research, Science and Technology (NCRST) with the aim of consolidating the management and coordination of research, science, technology and innovation in the country. The Commission is in the process of being actualized. It is expected that its operationalisation will streamline these anomalies.

3.4. The context of innovation within which it is conceived in the Namibian Science, Technology and Innovation System needs to be understood if it is to be accurately articulated in the National Strategic Plan for Science and Technology (NSPST). Whereas, in broad sense knowledge creation and innovation can be seen and translated to encompass circumstances that allow new knowledge and creative change to emerge in all components of the economy such as systems management, education, creative art and sports, environment conservation, innovations in Namibia's science and technology

development aspirations are conceived to comprise the development of local technologies that are appropriate to the development and expansion of local manufacturing industries and enterprises that in the long-run will transform the Namibian economy from current trade-based industries to sustainable technology-driven industries.

3.5. The overall mission of Namibian R&D institutions is to strengthen processes and enterprise productivity in order to raise the competitiveness of operating business in production, commerce and provision of trade services. They do so by providing information, technical advice or by facilitating the flow of available appropriate modern technologies and supporting enterprises with up-to-date technical information.

3.6. The R&D system comprises a number of institutions (see Appendix A) operating under various ministries, in parastatal organizations or as NGOs.

3.7. The Centre for Innovation, Entrepreneurship and Technology is in the process of being established to promote entrepreneurship and profitable value added productivity and to enhance the integration of science and technology in the national development process.

3.8. The University of Namibia and the Polytechnic of Namibia have high latent research capacity. Their current and planned research activities have great potential contribution to the goals and aims of Namibia's V2030. The Center for Applied Research and Technology at the Polytechnic of Namibia plans to undertake extensive and quite relevant aero-engineering and wave energy research that have exciting world-class innovation potential in the energy sector. Water engineering technology programmes proposed by UNAM's Multidisciplinary Research and Consultancy Center are equally impressive. Notwithstanding such commendable efforts and technological innovations such as the hybrid energy generation system and the PowerCan photovoltaic system, research reports and publications show, that much of the efforts at the University and the Polytechnic focus more on investigative research than technological innovations. The basic tenet of industrialisation that Namibia aspires to achieve by 2030 is production technology and technological innovations. This is where the engineering research emphasis should shift.

3.9. Currently, the Directorate of Research, Science and Technology is entrusted with the management and coordination of activities of the national R&D system. As part of the reform and measures towards efficiency, it is proposed to establish a Council for Research, Industry and Innovation (CRII), which will be the main instrument to promote industrial research and innovations and enhance public good research.

3.10. Critical constraints in the Namibia's science, technology and innovation system lie with how the roles played by the stakeholders are coordinated to ensure that they are harmonized and executed in tandem with the common objective of causing research, science, technology and innovation to increase economic growth and improve the livelihood of the Namibia people.

3.11. It will be important to have all stakeholders participate in one form or the other in the process of developing a national strategy for national science and technology investment plan, to ensure ownership of its content and commitment to its realisation.

3.12. There is little recorded information on levels of financial investment in STI generally and R&D funding in particular except for information included in the financing plan of the NDP2 where a provision of N\$63,200,000 for the entire plan period is reflected to support establishment of the S&T Innovation Fund, finance the S&T coordination and fund the regional innovation centres. There is evidence, however, that Government of Namibia is the main source of funding through treasury allocation to individual Ministries to support science and technology activities in their directorates, institutes or affiliated institutions. Supplementary funding in form of project support or contract research or commissioned study flows from the private sector particularly non-governmental organizations and international and regional development agencies. It is evident that systematic planning of financing STI is lacking. There is need for a framework for allocating the finances available for research and innovation in a systematic planned manner, based on predetermined development priorities translated from the national Vision, the NDP2 and national as well as relevant sectoral Strategic Plans, and most importantly, from a Science and Technology Strategic Plan.

3.13. Plans for financing research, science, technology and innovation from the National Research, Science and Technology Fund are reflected in the RST Act 2004. When operationalised, this will be an open gate through which commercial companies, industrial firms, banks and other private sector institutions and international development partners would support and complement Government efforts toward the development of science, technology and innovation for Namibia's economic transformation. It will also be a positive regulatory mechanism for prioritizing research in the country.

3.14. There is need however to undertake a study on research financing in Namibia to determine level and sources of funding with a view to rationalizing them alongside the National Research Fund. The latter is conceived as enhancement and not a replacement of the existing research and overall S&T financing mechanism. Consequently, the study of national research financing will provide useful prerequisite information to the process of operationalising the National Research, Science and Technology Fund.

3.15. There appears to be no framework currently for the management of intellectual property rights (IPR). The proposed Council for Research, Industry and Innovation provides an acceptable relief to handle this task until such a framework is well established to work in tandem with institutions and individuals whose inventions and innovations will require protection, whether in the process of technology transfer, or in the case of local scientific discoveries and technological innovations.

#### **4.0. Demand on Science, Technology and Innovation System**

4.1. The dynamics of development both in the service and productive sectors of the Namibian economy are putting increasing demand on her science and technology system. Based on Vision 2030, National Development Plan Two (NDP2), National Strategic Framework on Human Resource Development and Capacity Building, and the strategic objectives of sub-programme 5 (Knowledge Creation, Management and Innovation) of the ETSIP, there are demands from the planning, industry and enterprise and education and training sectors, to which the S&T system will need to respond in various but practical ways through policy conceptualization, policy operationalisation and implementation, providing framework for effective coordination of research, S&T, assurance of availability and relevance of knowledge, technology and innovations, and assisting in monitoring and evaluation of performance and impact of science and technology on the economy

4.2. The intervention will entail provision of advice to Government on nature of STI policy desired and the modality of their implementation; sensitization and awareness creation about position of ST and scientific research in national development and how they impact economic growth; establishment framework and structures for knowledge generation and creation of innovations; delivery of knowledge and innovations to production enterprises for integration in the production of goods and services and to central planning systems to facilitate national development planning, and development a framework for monitoring the performance of the science, technology and innovation sector.

4.3. As a key player in the science, technology and innovation system, the DRST will be expected to advise on the legal framework for the ST and Innovation System; provide leadership in the development of the national knowledge and innovation strategy; ensure the establishment of innovation and technology development framework, and develop indicators for measuring performance and impact of research, science, technology and innovation on economic growth and overall national development.

#### **5.0. Challenges and Opportunities**

5.1. The Namibia Government acknowledges that research, science and technology are vital for sustainable national economic growth. This imposes challenges to the sector. These include (a) increasing the impact of the S&T sector on the economic and social transformation process, (b) addressing sectoral S&T needs and inadequacies to increase their contribution singly and collectively to science-led technology driven economic growth, (c) developing a strategy and plans for effective integration of science and technology as a sector and the various contribution of various S&T disciplines in the service and production sectors of the economy, (d) increasing the catalytic role of S&T in the national development system, (e) strengthening the research capacity of the University and the Polytechnic of Namibia as well as other tertiary education and training institutions where there is currently high faculty capacity and postgraduate research potential for high level scientific, technical and engineering research, (f) building the

infrastructure especially for basic research, engineering, technological innovation and structural S&T formations for research that involve investigative social sciences and humanities. Fortunately, the social sciences research capacity at the University of Namibia is adequate.

5.2. The Government has committed itself and is making efforts to address the challenges. The Government enacted the RST Act, endorsed the establishment of CIET, launched the Food R&D Centre, endorsed as part of the RST Act the creation of the NRST Fund and has adopted mechanisms for expanding and making use of international linkages for the promotion and application of S&T for economic development. It still has the task of mainstreaming S&T in national development planning process and a daunting challenge to address the S&T infrastructure and to create a sustainable framework for knowledge generation and technology development. These are areas the Government will have to commit itself to build from its core funds since development partners usually support capacity building other than infrastructure and technology development. Unless Government adopts this strategy, Namibia may take some time to realize the value added product (VAP) economy whose success, in any case, will depend largely on the intervention of S&T and research- based scientific knowledge in natural resource-based development initiatives and in industry.

5.3. There are gaps also. There is distinct disharmony among sector-based policies affecting performance and impact of research, science, technology and innovation; human resource capacity is inadequate; there is little evidence that FDI ventures in Namibia have built arrangements for investing in local R&D development or supporting innovation ventures for product improvement; research financing is fragmented and inadequate; the S&T infrastructure is weak; key economic sectors such as mining and fishery (marine and inland) lack research facilities to support them, and within country linkages are generally weak with reasonably visible vertical linkages but poor horizontal linkages among S&T stakeholders. The industrial and manufacturing sector is founded on trade-based technology transfer through foreign largely South African based firms with branches in Namibia. This creates a clear scientific and technological knowledge gap. A policy and strategy to guide the research, science, technology and innovation system to support the transition and sustainability of a knowledge-based economy is also lacking.

5.4. Investing in research and innovation is key to generating appropriate sustainable technology and creating a knowledge economy that the people of Namibia aspire to achieve. Government will need to invest adequately in this area. According to the African Regional Human Development Working Paper Series Number 84 of the World Bank published in February 2005, less than 0.01% was spent on R&D between 1989 and 2000 spread across different S&T- related ministries. It can be safely concluded from the less visible research outputs that research financing is extremely inadequate and indirectly affecting negatively the potential output of the STI sector. Government will need to invest adequately in this area if it has to gradually move away from the trade-based industrial development.

## **6.0. Directorate of Research, Science and Technology**

6.1. The mission of the Directorate is to spearhead, coordinate and influence the development and implementation of appropriate policies, infrastructure and institutional arrangements; advocate the mechanisms necessary to encourage research, technical and scientific education, innovations and their output; and facilitate value adding linkages between and among industry, commerce, science and technology institutions and the wider community

6.2. Its functions include coordination and focusing of all scientific, technical and engineering, institutional and human resources in line with a national development objective; implementing programmes aimed at changing negative perceptions of the Namibian society with regard to science, technology and research for socio-economic and political development; identifying gaps in terms of scientific, technical and engineering, institutional and human resources and develop appropriated responses; developing national innovation, research and development capacity in order to enhance national potential for value added production and productivity; developing a science and technology knowledge management system; and integrating the use of ICT into society and programmes.

6.3. The Programme and activities of the Directorate are organized in four Divisions namely Research and Technology Development, Policy and Legal Framework Development, Industrial Linkages and Beneficiation and Information and Communication Technology.

6.4. The activities cover policy development, operationalisation of the NRST Act, policy development, R&D, promotion and popularization of S&T, information and knowledge management, regulatory initiatives, institutional development and collaboration, linkages and liaison.

6.5. The directorate has developed a number of policy and legal framework instruments which include the following:

1. National Policy on Research, Science and Technology (1999)
2. Research, Science and technology Bill (2004)
3. Research Policy (consultative process going on – draft policy due to be submitted to Cabinet in 2005)
4. National Policy on Biotechnology of 1999
5. Biotechnology Bill
6. Biosafety Bill – technical drafting completed
7. Biosafety regulations drafted (under the Biosafety Bill) – with Legal drafter
8. ICT policy in Education in the process of development

6.6. The Directorate of Research, Science and Technology undertook a comprehensive analysis of how best the unit would contribute to realization of objectives of the strategic plan for the education and training sector improvement programme in relation to

Namibia's intended transition to a knowledge economy. It identified capacity building at the levels of education and research, science promotion and awareness creation, research in mathematics and science education, harmonized information management systems, development of science development indicators as key areas to be addressed. Most importantly, it recognized the urgent need for funding sources that would contribute to the National Research Fund to ensure a stable system of knowledge generation and innovation - the key ingredients of the knowledge based economy.

6.7. The Directorate is constrained by acute lack of human resource capacity. It has a total of 10 graduates including management staff. This level of manpower can in no way handle the immense amount of national demand on the STI sector. In this regard, judged by its accomplishments, the Directorate should be highly commended for its performance even with that little manpower.

6.8. Further, the Directorate is constrained by lack of harmony and holistic approach in formulation of legal instruments actualizing S&T in different sectors, low investments in science and technology programmes generally, lack of elaborate national organizational structure that allows flexibility and concurrent implementation of S&T programmes, and inadequate human resource and financial budgets

6.9. Immediate plans of the Directorate include operationalisation of the National Commission for Research, Science and Technology and the National Research, Science and Technology Fund including the development of a national research funding system; development of a national policy for innovation and technology; operationalisation of the CIET; development of a national bridging programme for mathematics and science; strengthening the national Science Awards and Science Week activities; development of national science centers; training more Namibians at TTC and College Stations, and initiating a Women in Science programme aimed at increasing the number of women who take up careers in the sciences.

6.10. The main task of the DRST in the immediate future is to catalyse the creation and operationalisation of the National Commission for Research, Science and Technology by implementing the Research, Science and Technology Act, and as a first stage in that direction, create and operate a unit within the DRST that will act as the Secretariat and gradually build up the operations of the Commission.

## **7.0. Science, Technology and Innovation : Need for Strategic Direction**

7.1. Science and technology is a production input on the one hand and on the other hand it is a planning tool and a desired input in policy orientation. The current perception of research, science, technology and innovation contained in National Vision 2030, NDP2, draft National Strategic Framework on Human Resource Development and Capacity Building, and in the various sectoral policy frameworks, reflect consistency with this thinking on the role of research, science, technology and innovation in economic development in general, and in knowledge-driven development specifically. For example, the section on data and research, outlines the importance of research on social and

economic issues and research being undertaken in the country by numerous institutions both public and private such as UNAM, National Forestry Research Center, National Botanical Research Institute, DRFN, NEPRU, Namibia Nature Foundation, Central Veterinary Laboratory, National Forensic Laboratory, Namibia Meteorological Service and other ministries, agencies and parastatals. A further example is in the Human Resource and Capacity Development Strategic Framework where it is acknowledged “Namibia needs to move from being a ‘branch-plant economy’ to an economy that adds value to the multitude of raw materials we extract and export”. While, correctly, the emphasis is placed on human resource, it should be understood that the manpower on its own without skills and competence in science and technology cannot make desired changes in productivity. In the S&T sector, without doubt, the human capacity is much needed for generation, access evaluation adaptation and application of technology to bring about the transformation of the Namibian economy.

7.2. The National Planning Commission is aware that lack of a strategic plan for the S&T sector leaves the country operating without a clear strategic focus of how S&T should contribute to the objectives of V2030, the outgoing NDP2 and the incoming NDP3 and a framework within which this contribution should be realized. The implication of this is, that the NPC would like to see a strategic plan for the development and application of science, technology and innovation developed, an exercise in which the Commission sees itself as a key stakeholder and is keen to be fully involved.

7.3. Namibia is a drought prone permanently arid country with low and variable rainfall combined with a high percentage of sandy soils resulting in low agricultural productivity. Several policies aimed at improving levels of agricultural production have been adopted which include, inter alia, the Agricultural (Commercial) Land Reform Act (1995), the National Agricultural Policy (1995), aimed at addressing the constraints of sustainable crop and animal farming particularly those imposed by soil conditions and drought conditions. The research, science, technology and innovation programmes such as development of drought tolerant crop varieties and selection of drought prone high yield low intake livestock lines or cattle management under increasing human population, community-centred programmes for combating desertification, rangeland livestock management, agropastoral and agrosilviculture integrated production systems, rainfall monitoring improvement research, indigenous fruit trees research, and food and inland fishery research programmes in the ministries of Agriculture, Water and Rural Development; Environment and Tourism; and Fisheries and Marine Resources, and at the University of Namibia and non-government organizations including the DRFN are targeted at minimizing the impact of poor soil conditions and reducing excesses of desertification, improving food and economic security and increasing economic benefits to the people of Namibia. This endorses the inclusiveness among the stakeholders in research, science and technology of these institutions. Hence the centrality of their collective participation in developing a national strategy that will bind them to contribute towards a science-led technology knowledge economy for Namibia.

7.4. Among the major objectives of Vision 2030 is the transformation of Namibia into an industrialized economy of equal competitive opportunities and sustainable growth

potential with the aspiration to improve quality of life of all Namibians. Industry and overall industrial development are linked to production technology, research and technological innovations. Sustainable industrial development for Namibia will be built on specialized industries benefiting from technology transfer through FDI and EPZ to meet regional and international competitiveness, and the emergence of value added production in small scale industrial enterprises whose strength will most likely be built not on technology transfer through FDI but on science-based technological innovations. Either way, research and innovations focused on value addition and product improvement in specialized industries and at the level of small and medium scale industrial production enterprises are scientific and technological contributions that cannot be ignored at this point of Namibia's development planning. Because of this, the trade and industry sector is seen as a key stakeholder in the development of a science and technology and innovation strategy to support Namibia's future science-led technology based industrial development efforts.

7.5. The 2030 Vision considers leveraging knowledge and technology as a critical factor in realizing the objectives of V2030. Consequently, the institutions of higher learning, namely the UNAM, PoN, VTI and TTC are critical in that they are the building blocks of the knowledge society that Namibia aspires to achieve in her V2030. They are also the bricks, motor and concrete for constructing the science and technology foundation on which industry, sustainable natural resource base, and societal services will hang. The teaching of science, mathematics engineering and technology and consequent building of competence in scientific and technological skills that is required in research, industry and service sectors is, in a way, entrusted to these institutions. These institutions have a direct stake in the strategy that Namibia will develop and adopt for future development of science and technology.

7.6. In many countries, legal and regulatory agencies tend to not consider themselves part of the national science and technology system. This is a historical academic division of sciences on one part and social sciences and humanities on the other part. In the integrated national development process these agencies which include, legal authorities, quality and standardization bureaus and such institutions as customs and excise authorities, form part of the national science and technology development system because the nature of their functions can promote or inhibit the development of science, technology and innovation or their application for economic growth.

7.7. Legal and ethical issues related to patents rights, technology transfer, technology negotiations, intellectual and industrial property rights, protection and conservation of Namibia's indigenous knowledge, adoption of and implementation of S&T related international conventions and protocols, issues of genetically modified living organisms and use of human and animal subjects in medical research, are not irrelevant to Namibia. In trade-branch industrial economies similar to Namibia's, legal issues of industrial property rights, use of trademarks, legal issues connected with copyrights, joint ventures and venture capital will constantly emerge. All these are S&T related matters in the legal and regulatory domain only competently handled by legal experts. This makes legal and

regulatory agencies in Namibia necessary interventionists in the charting of a new national direction for science and technology.

7.8. The current situation in Namibia is that Parliament, the law making institution, and financing institutions are not visibly seen as part of the national science and technology system even though they are by virtue of their roles in establishing law that create favourable environment and providing the financial muscle respectively for enhancing the generation, adoption and application of science and technology in the national economy. DRST and the upcoming NCRST have a task at their hands to democratize S&T and sensitize the legislature and the financing and banking sectors in order to increase the impact of S&T on the Namibian economy. Their involvement in focusing the strategy through which S&T will catapult Namibia's economy to address the poverty gap and improved human livelihood is imperative.

7.9. An important aspect of the National Vision 2030 is that of cross-cutting nature of the S&T sector. Its integration in other sectors of the economy implies convergence of policies as well as macro level planning and performance monitoring demands on the sector from the other sectors. This poses an issue for Namibia regarding the positioning and placement of the S&T sector whose responsibilities cut across other sectors. It is an issue the strategic framework for development of science, technology and innovation in Namibia will need to address sooner than later.

7.10. Among the currently strategic decisions and priority measures towards strengthening Namibia's S&T system is the development of a Strategic Plan for STI whose principle objectives will be to define what STI for which Namibia must to strive, how it will acquire it, in what time frame, with what resources and how it will assess its success or failure in this process. A further objective of the Strategic Plan will be to streamline and harmonise efforts aimed at integrated development and application of research, science, technology and technological innovations to address the goals and objectives of the V2030, MDG and the NDP. It is **recommended**, therefore, that steps be taken towards preparing a national science, technology and innovation strategy and plan.

## **8.0. The Way Forward**

8.1. Several areas of immediate attention have been identified. These are:

- status of S&T in Namibia – situation analysis/country S&T profile study; this is a prerequisite for and stage one of the development of the S&T strategic plan process;
- development of strategy for implementation of the RST Act;
- operationalisation of the NCRST – design and structure, programmes, positioning/placement, funding mechanisms, staffing, reporting systems, relationships, budget;
- operationalisation of the NRST Fund – development of regulations
- training in methodology of developing the strategic plan for S&T development – to include participants from sector ministries, NPC and DRST staff;

- Development of the strategic plan.

8.2. These areas have been condensed into the following three projects that are **recommended** for Namibia to implement in the short-term.

**Project One:** - *Study of the National Science and Technology profile*

There is need to carry out a situation analysis of the status of research, science, technology and innovation in Namibia as a first priority towards the development of a national strategic plan for S&T. On the demand side, this exercise will respond to the lack of holistic data on the potential of science, technology and innovation as a possible driving force for the Namibian economy. On the supply side, the undertaking will provide information and data for purposes of planning, priority setting and policy design and decision-making. It will also articulate issues of S&T coordination and relationships among S&T development institutions that need to be addressed in the process of developing the National Strategic Plan and Development Framework for Science and Technology (NSP-DFST).

The objectives and targets of the strategic plan should constitute progressive stages of a pedestal on which the public sector in collaboration with private sector and civil organizations and development partners shall strive to develop science and technology capacity and apply it to meet the demands of Namibia’s development aspirations, and in particular, the demands of her economic growth.

It is **recommended**, this study be undertaken by a National Working Group assisted by SWGs appointed by DRST assisted by a UNESCO Consultant under the leadership of the DRST and the Project Management Unit (Secretariat) entrusted with setting up the National Commission for Research, Science and Technology. The budget for this proposal is approximately N\$171,090 (equivalent to US\$28,515) The summary of the budget is given below.

***Budget for Project One:***

Honoraria for NWG (8) and SWG (10) Resource Persons	
for average 14 days xN\$250	63,000
Per Diem for WG (6) field data collection trips	14,400
(N\$480/dayx 6peoplex5days)	
Transport for WG Field Trips (6peoplexN\$10,190)	60,890
Consultant – air ticket	10,000
Per diem N\$600x7 days	4,200
fee N\$1800x7days)	12,600
Production and dissemination of Report	6,000
<b>Total:</b>	<b>N\$171,090 (US\$28,515)</b>
	<i>(exchange rate used: US\$1=N\$6.0)</i>

**Project Two:- Operationalisation of the NRST Act**

The Research, Science and Technology Act was enacted in November 2004. It provides for the establishment of the National Commission for Research, Science and Technology and its organs and most importantly the creation of a National Research, Science and Technology Fund to support the development, management and application of science, technology and innovation. The development of Namibia's Research, Science and Technology Plan will be developed under the aegis of the DRST that is in the process of establishing the Secretariat for the NCRST. The notice for commencement of the Research, Science and Technology Act is held back by lack of regulations on certain provisions of the Act (regulation on establishment of the Councils, (section 19), regulation on research institution registration (section 20 (2), application and registration fees (section 20 (3), definition of institutions that need apply to conduct research (section 21 (1), the Minister to authorise and the manner of authority (section 21 (2), persons required to give prescribed information and what is prescribed information (section 22 (3) etc.

The operationalisation of the Act is an immediate priority and urgent matter. It is **recommended** that UNESCO considers and seeks funding to support a Head-Start programme to establish Secretariat for operationalisation of the National Commission for Research Science and Technology. It is further recommended that UNESCO identifies and assigns an Advisor to (a) assist DRST in developing relevant regulations for facilitating the issuance of Government Notice providing for commencement of the Act and (b) assist in operationalising the National Commission for Research Science and Technology as soon as the regulations are in place. The Advisor will work under the DRST with senior officers seconded from the DRST in accordance with the Public Service Act to set up the Secretariat/Project Management Unit for the National Commission for Research, Science and Technology.

This Head-Start project will cover development of strategy for implementation of the RST Act, particularly design and development of structures and a framework for implementation the Act and assistance to DRST in establishing the NCRST Secretariat. The team of technical officials seconded to the Project Implementation Unit/Secretariat will need to consist of not necessarily technocrats but strategic futuristic thinkers conversant with S&T and R&D systems planning and development and how such systems are linked to mainstream stakeholders including the political sector and resource allocators.

The budget for this proposal (excluding emoluments for the external Project Technical Advisor) is approximately N\$1,452,130- (equivalent of US\$242,022-) for year One.

**Budget for Project Two:**

**Personnel:**

Executive Officer/D/Director(seconded from DRST)(1)* N\$18,000/mx12	216,000
(Head of the Secretariat/PMU and Counter-Part to Project Advisor)	
Consultant/Project Technical Advisor – (UNESCO appointment)(2)**	*****
Finance, Accounts and Procurement (FAP) Officer-N\$15,000/mx12	180,000
(appointment or seconded from DRST)*	
Administrator 1 (establishment and logistics) – N\$15,000/mx12	180,000
(appointment or seconded from DRST)*	
Administrator 2 (programme support) – N\$15,000/mx12	180,000
(appointment seconded from DRST)*	
Science Planning and Development Officer	180,000
(seconded from DRST)*	
Driver-	30,000
Office Cleaner/Messenger	13,000
	<i>Sub-total for Local Personnel</i>
	979,000

**Support Services**

Office Rental	N\$5000/m/12	60,000
Stationery	N\$3800/m/12	45,600
Communication:	N\$4000/mx12	48,000
- Internet )		
- Fax )		
- Telephone )		
Vehicle hire	N\$3000/mx12	36,000
Vehicle maintenance	N\$300/m/12m	3,600
Fuel	N\$1000/mx12m	12,000
Equipment maintenance	N\$400/mx12m	4,800
Office logistics	N\$100/mx12m	1,200
	<i>Sub-total for Support Services</i>	211,200

**Equipment**

- computers and accessories	N\$10,000x6offices	60,000
- scanner	N\$2000	2,000
- fax machine	N\$2000	2,000
- furniture (for 6 officers and reception desk)		20,000
- filing cabinets	N\$700x6	4,200
- Vehicle Hire (1)	N\$3000/mx12	36,000
	<i>Sub-total for Equipment</i>	124,200
Meeting Expenses 12meetings/20peoplexN\$480		115,200
	<b>Total</b>	<b>1,429,600</b>
Contingency (5% of non-staff and non-equipment cost)		22,530
	<b>GRAND TOTAL</b>	<b>1,452,130</b>

equivalent to US\$242,022

(exchange rate used US\$1.0 = N\$6.00)

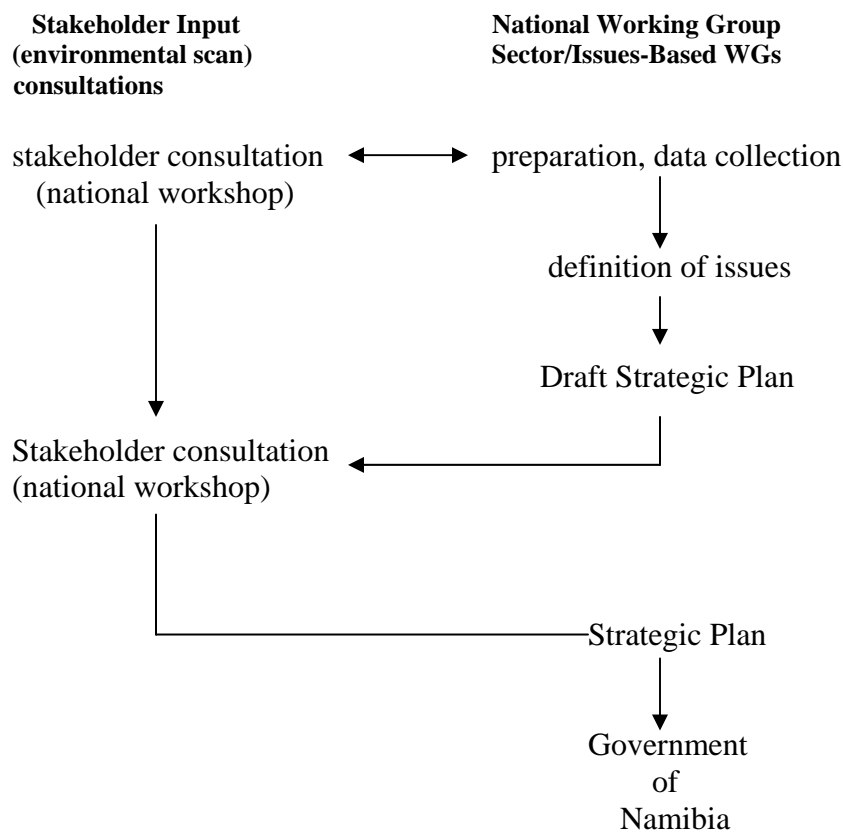
(1)\* salary levels and conditions of service in accordance with Public Service Act

(2)\*\* employed on UNESCO terms and conditions of service for Technical Advisors

**Project Three:** - *Training on Methodology for Development of the Research, Science and Technology Strategic Plan*

The stakeholders must be made aware of the Research, Science and Technology Plan and be part of the formulation process. To achieve these objectives it will be necessary for the DRST to undertake induction and sensitization missions to all stakeholders most probably through induction, planning and methodology workshops. It is **recommended** that such workshops be part of the consultative process of developing the RS&T Plan where all stakeholders are represented and that the DRST be the lead agency assisted by the NCRST Secretariat with close collaboration from the National Planning Commission.

- Development of the SP (NWG and SWGs)  
(Lead agency: DRST/NCRST Project Management Unit)



**S&T STRATEGIC PLAN DEVELOPMENT PROCESS OVERVIEW**

*Proposed List of Participants in the Strategic Plan Development Methodology Training Workshop:*

- Office of the President
  - National Planning Commission  
(Directorates of Development Planning and Economic Affairs etc)
- Office of the Prime Minister

- Directorate(s) responsible for coordination and monitoring
- Ministry of Agriculture, Water and Rural Development
- Directorate of Research
  - Directorate of Livestock
  - Directorate of Extension Services
  - NAMWATER
- Ministry of Education
- Directorate of Basic Education
- Ministry of Higher Education, Vocational Training, Science and Technology
- Directorate of Higher Education
  - Directorate of Vocational Training
  - Directorate of Research, Science and Technology
- Ministry of Defence
- Ministry of Environment and Tourism
- Directorate of Environment
- Ministry of Finance
- Ministry of Fisheries and Marine Resources
- Directorate of Fisheries
  - Directorate of Marine resources
- Ministry of Foreign Affairs
- Directorate of International Cooperation
- Ministry of Health and Social Services
- Directorate of Medical Services (medical research, science an technology)
- Ministry of Information and Broadcasting
- Directorate of Information
- Ministry of Justice and Attorney General
- Directorate of Legal Affairs (responsible for Intellectual Property Rights - Patents, Trade Marks, Copyrights etc)
- Ministry of Labour and Social Welfare
- Ministry of Lands, Resettlement and Rehabilitation
- Directorate of Land Survey
- Ministry of Mines and Energy
- Directorate of Mining
  - Directorate Department
  - NAMPOWER
- Ministry of Regional, Local Government and Housing and Rural Development
- Directorate of Rural Development
- Ministry of Trade and Industry
- Directorate of Industry
  - Directorate of Trade
- Ministry of Gender, Equality and Child Welfare
- Ministry of Works, Transport and Communication
- The Namibia Parliament
- Office of the Auditor General
- University of Namibia

Polytechnic of Namibia  
 - Department of Academic Affairs and Research  
 Heads of Vocational Training Institutes  
 Heads of Teacher Training Colleges  
 Desert Research Foundation of Namibia  
 National Chamber of Commerce and Industry  
 Bank of Namibia  
 Small and Medium Enterprises Corporation  
 Center for Applied Research and Technology (Polytechnic of Namibia)  
 Multidisciplinary Research and Consultancy Centre (University of Namibia)

***Budget for Project Three:***

Hire of Conference	N\$108/dayx5daysx65people	35,100
(includes Lunches and one break tea serving)		
Afternoon Break tea/coffee	N\$10/personx65 participants	650
Per diem for upcountry participants	N\$480/person/dayx6daysx25people*	72,000
Stationery for the Workshop	N\$2000	2,000
Communication	N\$6000	6,000
Photocopying expenses	N\$10,000	10,000
Logistics expenses	N\$10,000	10,000
Honoraria to Resources Persons		
- Trainers (3)	N\$1200/dayx3x5days	18,000
- rapporteurs (2)	N\$600/dayx2x5days	6,000
Transport costs (persons using private cars)		
Report production expenses	N\$20,000	20,000
- editing	)	
- printing	)	
- dissemination	)	
External Consultant (1)		
- per diem (10 days)	N\$600/dayx10days	6,000
- air ticket (economy class)	N\$10,000	10,000
- fees (10 days)	N\$1800x10days	18,000
Reception	80people/N\$120	9,600
Sub-Total:		223,350
Contingency (5%)		11,167.50
<b>Grand Total:</b>		<b>234,517.50</b>
(equivalent to US\$39,086.25)		

(exchange rate used US\$1.0 = N\$6.00)

\*assumed 25 people will come from upcountry

## **9.0. Work Plan/Time Table**

### **9.1. Situation Analysis :** November 2005 – January 2006

- i. NWG and SWGs established : November 2005
- ii. Identification of external resource person : November 2005
- iii. Information/Data collection : January 2006
- iv. Analysis and preparation of draft report : February-March 2006

### **9.2. Development of draft regulations :** November – December 2005

- i. appointment of Consultant/resource person : November 2005
- ii. review and drafting of regulations : December 2005
- iii. adoption of draft regulations : January 2006

### **9.3. Establishment of the NCRST :** March –December 2006

- i. setting up within DRST Secretariat and officer for handling the NCRST operationalisation – ?October –November 2005
- ii. appointment of management officials of the NCRST : March – June 2006

### **9.4. Training Workshop for STI Strategic Plan Development Approach and Methodology :** May 2006

- i. set up joint DRST/NPC workshop organization Committee : November 2005
- ii. participants identified : November 2005
- iii. invitations sent out : January 2006
- iv. training Consultant/Resource Persons identified : January – February 2006
- v. invitation reminder : February 2006
- vi. workshop convention : April 2006

### **9.5. Launch of the SP development exercise :** April 2006

First stakeholder consultation workshop : April 2006

- i. first stakeholder consultation workshop : April 2006
- ii. identification and establishment of NWG and SWGs for development of the SP : April 2006
- iii. appointment of Consultant/Resource Person for the development of the SP : April 2006
- iv. commencement of work by WGs : April 2006
- v. 2<sup>nd</sup> stakeholder workshop ; presentation and review of NWG and SWG reports : July 2006
- vi. Drafting final SP by Consultant and NWG : July-August 2006
- vii. Submission of the final SP to GoN : October 2006

## 10.0. APPENDICIES:

### Appendix A: Identified R&D Institutions in Namibia

- National Marine Information and Research Station – this is a newly established center under the UNAM located at Henties Bay
- Namibian Institute of Mining and Technology –vocational training center located in Arandis for training artisans for the mining industry. Apparently no research in mining and technology is undertaken at the Institute
- Olute Food Research and Development Centre – MHEVTST –to be developed into a National Food Research and Development Centre as part of the Centre for Innovation and Entrepreneurship and Technology (CIET) – has one full time staff with another staff on training in USA in food technology
- Hardap Freshwater Research Institute located in Mariental
- Namibian Maritime and Fisheries Institute in Walvis Bay
- Desert Research Foundation of Namibia – NGO established in 1991 with close links to Ministry of Environment and Tourism involved in training and capacity building through knowledge sharing but with facilities for investigative research on arid environment and opportunities for postgraduate training as part of its programmes
- Central Veterinary Laboratory – service facility for the Ministry of Agriculture
- Mashare Agricultural Development Institute
- Namibia Meteorological Service
- Department of Water Affairs
- NAMWATER Research Unit
- National Institute for Educational Development
- Namibia Economic Policy Research Unit
- Department of Environmental Affairs
- Central Bureau of Statistics (part of National Planning Commission)
- National Forensic Laboratory – service facility located in Ministry of Home Affairs
- National Forestry Research Centre – facility of the Department of Natural Resources in the Ministry of Environment and Tourism
- Directorate of Research and Ministry of Agriculture, Water and Rural Development
- Ministry of Agriculture, Research Unit
- National Botanical Research Institute – Ministry of Agriculture, Water and Rural Development
- Bergvlug Research Station – Ministry of Agriculture, Water and Rural Development
- Geological Survey Department – located in the Ministry of Mining and Energy has a service facility for mineral dressing
- Shell Gas Exploration Unit (Kudu Gas exploration initiative)
- Namibia Nature Foundation
- National Museums or Archives
- Multi-Disciplinary Research Centre (UNAM)
- Center for Applied Research and Technology under Polytechnic of Namibia

- Gobabeb Training and Research Centre – operating since 1961 and jointly supported by the Ministry of Environment and Tourism and Desert Research Foundation of Namibia, the Centre facilitates training and provides facilities for resident and visiting researchers. It is located in Walvis Bay.

## **Appendix B. Institutions Identified as S&T Stakeholder in Namibia**

### National Planning Commission

- responsible for strategic and perspective planning for science and technology intervention in national social and economic development

### Office of the Prime Minister

- responsible for coordination and performance monitoring of government business

### Ministry of Agriculture and Forestry

- mainstream stakeholder because agriculture and natural resources are central to Namibian economy and livelihood

### Ministry of Education

- responsible for science education, training and manpower development - mainstream research, science and technology stakeholder

### Ministry of Higher Education, Vocational Training, Science and Technology

- lead and mainstream stakeholder; custodian of national research, science, technology and innovation

### Ministry of Defence

- This is a mainstream stakeholder institution. Military science and technology encompass basic and applied science and technology; the military profession employs scientists and engineers (physicists, forensic scientists, doctors etc) and engineers and conducts research in areas such as ballistics, medicine, telecommunication, electronic delivery systems and computer systems.

### Ministry of Environment and Tourism

- mainstream stakeholder since environmental research is an imperative for Namibia

### Ministry of Finance

- science and technology is money; they are the source of revenue and wealth creation from commerce and industry. Industrial production is untenable without S&T input. Ministry should have interest in the impact of S&T on industry and revenue earning. The Ministry is responsibility for financial resource allocation and evaluation of impact of RST on the economy and their value for money. It is considered a key stakeholder in S&T.

#### Ministry of Fisheries and Marine Resources

- mainstream stakeholder because fishery and marine resources research are central in Namibian economy

#### Ministry of Foreign Affairs

- has a stake in RST in that it handles matters of international cooperation and international policy – key stakeholder

#### Ministry of Health and Social Services

- mainstream stakeholder because of its responsibility for medical and health research

#### Ministry of Information and Broadcasting

- responsible for information as a software input in ICT systems – considered mainstream RST stakeholder

#### Ministry of Justice and Attorney General

- considered key stakeholder because of its central role in issues of intellectual property rights

#### Ministry of Labour and Social Welfare

- science and technology creates employment and is a source of revenue meant to address poverty

#### Ministry of Lands, Resettlement and Rehabilitation

- land survey and land economics that relies on land survey are engineering and research related. The Ministry is considered an auxiliary stakeholder because these activities though peripheral are linked to research and/or science and technology

#### Ministry of Mines and Energy

- mainstream stakeholder because mines exploitation, mineralogy and energy generation are based on and benefit directly from research, science and technology.

#### Ministry of Regional, Local Government and Housing and Rural Development

- the relevance of science, technology and innovation to rural development and to housing construction relegate the Ministry to a STI key stakeholder

#### Ministry of Trade and Industry

- this is a mainstream stakeholder given the potential role of research, science, technology and innovation in enhancing industrial production, improving the quality and increasing the volume of manufactured trade products.

#### Ministry of Gender, Equality and Child Welfare

- because of the emphasis on developing women in science the Ministry is considered a mainstream stakeholder

Ministry of Works, Transport and Communication

- mainstream stakeholder because of the imperative role of S&T in these sectors especially in the telecommunication sector

The Namibia Parliament and the Office of the Auditor General are considered key stakeholders in S&T because of their legislative and ombudsman roles.

Bank of Namibia

- financing institutions are key to supporting the growth and application of technological innovations through loan financing and technology development support financing thus facilitating the link between innovation and enterprise sectors. The Bank of Namibia representing the financing institutions is perceived as a mainstream stakeholder in the development and application of research, science, technology and innovation.

### **Appendix C. Institutions Visited:**

1. University of Namibia
2. Polytechnic of Namibia
3. Center for Applied Research and Technology
4. Multi-disciplinary Research and Consultancy Center
5. Desert Research Foundation of Namibia
6. National Planning Commission
7. Ministry of Trade and Industry
8. Ministry of Fisheries and Marine Resources
9. Ministry of Mines and Energy
10. Directorate of Energy
11. Ministry of Mines and Energy
12. Directorate of Mining
13. Office of the President  
(National Planning Commission)
14. Ministry of Agriculture, Water and Rural Development  
(Directorate of Agricultural Research)

### **Appendix D. Persons Met/Consulted:**

Dr. Alexandros K. Makarigakis  
Science Assistant Programme Specialist  
UNESCO Windhoek Cluster Office  
5 Brahms Street, West Windhoek

Professor Keto Mshigeni  
University of Namibia  
Windhoek, Namibia

Mr. Alfred van Kent  
Director  
Directorate of Research, Science and Technology  
Ministry of Higher Education, Vocational Training, Science and Technology)

Mr. John Sifani M.  
Deputy Director  
Industrial Linkages and Beneficiaries  
Directorate of Research, Science and Technology  
Ministry of Higher Education

Dr. Lynn K. Mytelka  
Consultant  
World Bank and  
Senior Research Fellow  
United Nations University  
The Netherlands

Ms. Kaatry Imalwa  
Deputy Director  
Regional and Sectoral Planning  
Directorate of Development Planning  
National Planning Commission  
Office of the President

Mr. Vekondja Hugo Aupa Tjikuzu  
Head, Population and Human Resources Planning  
Macro-Economics and Sectoral Planning  
National Planning Commission, Office of the President

Professor Hina Mu Ashekele  
Director  
Multidisciplinary Research and Consultancy Centre  
University of Namibia

Mr. Ranongouje Arnold Tjihuike  
Deputy Director  
Ministry of Trade and Industry

Ms. Immolatrix Geingos  
Deputy Director  
Directorate of Research, Science and Technology  
Ministry of Higher Education, Vocational Training, Science and Technology

Mr. Israel Tjizake  
Science Technology Officer (S&T Planning)  
Directorate of Research, Science and Technology  
Ministry of Higher Education, Vocational Training, Science and Technology

Ms. Anna Ndinela Erastus  
Director (Policy, Planning and Economics)  
Ministry of Fisheries and Marine Resources

Dr. Stephen Frindt  
Chief Economic Geologist  
Department of Mining  
Ministry of Mines and Energy

Mr. Mulife S. Siyambango  
Chief Inspector (Petroleum Affairs)  
Department of Energy  
Ministry of Mines and Energy

Mr. Sheehamandje Ipinge  
Deputy Director (Plant Production Research)  
Ministry of Agriculture, Water and Rural Development

Professor Ulrich Schmitt  
Vice Rector (Academic Affairs and Research)  
Polytechnic of Namibia

Dr. Harald Herbertsson  
Director  
Center for Applied Research and Technology  
Polytechnic of Namibia

### **Appendix E: Documents Consulted:**

Namibian Vision 2030. Policy Framework for Long Term National Development (Main Document) – 2004. Office of the President.

Namibia's Second National Development Plan (NDP2) 2001/2002 – 2005/2006

- Volume One (1 & 2) – Microeconomic, Sectoral and Cross-Sectoral Policies
- Volume Two                      Regional Development Perspectives
- Volume Three                    Public Sector Investment Programme – Financing the Plan

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