



Established by Section 4 of the Research, Science and Technology Act, 2004 (23 of 2004)

Excerpt from the National Programme on Research, Science, Technology & Innovation (NPRSTI) 2014/15 to 2017/18

The Research, Science and Technology Act (RST) Act No 23 of 2004 allows for the establishment of a National RST Programme. This programme is developed every three years and sets out the national direction on research, science and technology for Namibia amongst other things.

The current programme for the period 2014/2015 to 2017/2018 is currently with Cabinet for endorsements. As such, a summary of the programme's priority areas are listed below:-

PRIORITY RESEARCH AREAS

The priority research areas are those addressing the primary aims of the country, contributing to solving social problems and economic development. The areas have been grouped as those specifically related to the primary social and economic challenges of Namibia, and those areas formed by horizontal technologies of application in the majority of the fields.

1.1 Research areas addressing economic and social challenges

1.1.1 Health

Research and innovation may have a strong impact in the ability of the health sector to contribute to efficiently dealing with some of the main aims of the National Development Plan (NDP4), as is the case with clinical research on extreme poverty related diseases; translation of research findings into the clinical and other health care fields which will also contribute to reduced health inequalities.

Namibia's health system has to respond to infectious diseases and other common health problems in infancy and childhood. Research on solutions offered to HIV/AIDS, cancer and tuberculosis patients as well as on their social environment (nutrition, poverty, crowding, etc.) are needed. Other endemic diseases such as malaria and polio need approaches that will lead to total eradication.

The nutrition situation and diet deficiencies of the population, as well as the importance of supply and access to medicines are objectives set out in the national health policies, and can be addressed through research between health and academic institutions. Regional and international cooperation can also allow partnerships in translational research and clinical trials.

1.1.2 Agriculture

The introduction of technology solutions in agricultural production can contribute to a significant change in the farmers needs and has a great potential for crop intensification and diversification, upgrading the breeding of livestock and other animal resources and sustained rural development, helping to achieve the objective of national food security. Enabling biotechnologies in consideration with the laws of the country will be an important element in achieving these goals. Given the high population involved in agriculture and the economic importance of the sector, research in this field will contribute to integration of populations in rural areas through access to sufficient food, provision of skills and jobs for women and youth, development of sustainable food production systems, improvement of management of natural resources and ecosystems and reduction of poverty.

The importance of marine resources as a source of income for the Namibian economy requires research and innovation to add value and develop new products in fish processing, as well as to develop and implement vessels monitoring systems.

Fisheries research will support progress in working in deeper waters offshore, valorising the diversity of marine life and promoting sustainable fishing of deep-sea resources, as well as caring of the marine environment. There is also a need for freshwater and inland aquaculture understanding, which requires intensified efforts in biological research.

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1.1.4 Water

The general national objectives under Vision 2030 for the Namibian water sector is to achieve the efficient supply and allocation of water to ensure equitable access to clean water and sanitation by all as well as to contribute to the long-term social and economic development of Namibia. However, achievement of this objective poses a challenge due to Namibia's dry climate and unpredictable rainfall (including skewed income distribution) and as such it can only be addressed through a high degree of efficient development and management of its water resources. In this regard, the key challenges of the water sector will be to address the technological, capacity constraints (human and institutional), financial and socio-economic issues as outlined under the consolidated (National Integrated Water Resources Management (NIWRM) Plan 2010. This is based on ensuring the environmental sustainability of water use and re-use; full participation of the stakeholders and strong institutional capacity from local to national level. Water Demand Management and integrated resource management are essential. However, these must be complemented with engineering and science knowledge related to water infrastructure and resource conservation as well as budgeting and controlling skills.

Water is an essential resource for the livelihood of the people and an essential input in agriculture and mining. Safe and reliable quality water supply and sanitation services should be available for urban and rural areas. Irrigation, industry and mines will require the development of research and technology on water and waste water management schemes, water treatment technologies and water use efficiency. Research is also needed especially to develop technologies for flood water harvesting.

1.1.5 Energy

Energy supply in a sustainable and efficient manner will require technology solutions for accessibility to energy sources such as renewables which will reduce carbon emissions. Technological solutions should support a higher efficiency in energy uses contributing to economic gains in industry, urban and domestic uses, and at the same time reduce the overload that has been experienced in the country.

Research and innovation in renewable energies will promote technological innovations for production, distribution and storage, alternative energies, including wind, solar or biMOAss sources well adapted to meet development challenges in rural electrification, rural water supply and solar housing and water heating.

In order to achieve security of supply, economic efficiency and sustainability the energy policies of Namibia affect energy demand (mainly households), supply (electricity, upstream oil and gas,

downstream liquid fuels, downstream gas, and renewable energy) and a number of cross-cutting issues (economic empowerment, environment and energy efficiency) requiring a strong support from research and development activities.

1.1.6 Geosciences

Geoscience research has a critical role in addressing Namibia's socio-economic issues through basic and strategic research initiatives. Geo-scientific information is used in tandem with other science information to develop best practices and frameworks to e.g. guide land-use decisions, conduct geo-environmental monitoring, mitigate adverse environmental effects and identify water resources, to ensure the availability and sustainability of resources for the benefit of society. Increasing the amount of detailed and reliable geological map coverage through surveying and research is important for the support of, among others, mineral exploration in Namibia.

1.1.7 Mining

The mining industry is a major contributor to Namibia's economy and one of the major contributors to the GDP. Mineral resources aside, the financial surplus of mining can foster development in other sectors. A comprehensive geoscientific knowledge base underpins a robust and sustainable mining industry, since geosciences form part of the foundation of the mining sector value chain. Geoscience data and information play a pivotal role in stimulating investment in the mining industry. Apart from the major mining companies, the development of Small Scale Miners is a priority for the MME.

1.1.8 Indigenous knowledge

The indigenous knowledge developed over centuries in Namibia has created the basis for local technological advancement. In order to keep the legacy of that indigenous knowledge, to protect it, to store it and to avoid its loss over time, systematic research effort has to be deployed while looking for applications, innovation, verification and commercialization to suit current situation.

Thus the conservation of genetic resources of indigenous, wild, cultivated and other plant species, as well as the creation of reliable germplasm banks and collections constitutes a strong challenge for researchers. Therefore research opportunity exists to close this identified information gap. Research in this area will also benefit the country on its quest to document indigenous knowledge for the benefit of future generations.

1.1.9 Social Sciences and Humanities

The Social and Human Sciences have a vital role for understanding major social-cultural changes and shifts in the social, cultural, political and economic spheres of Namibia society. Many challenges face Namibia in the struggle to overcome underdevelopment and become a prosperous industrialised knowledge based society. To overcome underdevelopment, Namibia must not only address past historical development imbalances, but also look towards the creation and fostering of a new society which is competitive globally. There is therefore a research opportunity to address these socio-economic, cultural and political challenges of a rapidly evolving society in a globalised world.

RSTI would be performed to improve development policy formulation and implementation, manage societal conflicts emanating from inequitable distribution of resources, and enhance popular participation, rural development and the challenges of modernisation. RSTI would also be applied to assess the country's ability to harness emerging technologies to accelerate development and problem solving in society.

Due to crosscutting of issues related to social sciences and humanities with other research priority areas, research will be integrated with all the rest of the priority areas. Research that supports the search for scientific and technological solutions for the societal challenges, and supplying evidences and new approaches to contribute to policy development. Research in this field will be closely related to current and emerging societal challenges and in relation to the social and economic objectives.

1.1.10 Indigenous Knowledge Systems

Various communities, cultures and societies have Indigenous Knowledge Systems (IKS). At times, this knowledge covers several generations and increased effort should be made to document IKS in a way which makes it possible for use in modern local decision making activities (including in agriculture, health care, food preparation, education, natural resource use and management etc.)

1.1.11 Logistics

NDP4 cites logistics as one of its key priority areas. Whilst logistics is important in its own right, its true value comes when, as a tool, it succeeds in facilitating and generating trade that, in turn, can stimulate national and regional development. Neither marketing nor logistics can exist

independently; rather, they should work in combination to enable the generation of trade, which can foster national development.

Clearly to operate successfully, logistics must be supported by adequate infrastructure and transport, but to concentrate on these issues alone would be to ignore a large part of the problem and would most probably be doomed to failure. Even if the infrastructure issues could be resolved overnight, it is unlikely that Namibia would have a successful logistics industry. To do so much wider, and softer, issues such as attitude, culture, service and training would need to be addressed.

Research and innovation on networks design, equipment and systems will facilitate attaining the objectives of the NPD4 with high levels of efficiency, reducing the use of fuels, costs and times of transport while increasing accessibility. Research and innovation on infrastructure solutions is necessary to deal with innovative traffic management, information systems, efficient logistics and maintenance technologies.

One of the key ambitions for the logistics sector is to develop a logistics hub / cluster around the Walvis-bay port that would become a gateway to SADC. In the light of this the following strategic initiative is suggested.

1.1.12 Environment and Tourism

RSTI in Environment and Tourism priority shall be geared towards maintaining and enhancing the quality and sustainability of the environment and to integrate environmental concerns in all development policies as well as to improve the tourism industry for better service delivery. The utilization of the tourism industry for development at socio-economic and thus community level is an important consideration here.

1.2 Research areas addressing enabling technologies

The research areas addressing enabling technologies will provide wide-application solutions and will contribute with solutions to the economic and social challenges. Four such areas have been identified as priority within the NPRSTI and include manufacturing technologies, information and Communication Technologies, Biotechnology and Space Science.

1.2.1 Manufacturing Technologies

A special RSTIP specific to manufacturing sectors should be developed and initiated with the relevant stakeholders. An RSTI-manufacturing program should be focused to identify

and develop/adapt/source appropriate technologies required to leapfrog the manufacturing of products and services in the sectors where Namibia has competitive economic advantages. Consequently, required human resources and institutional support as required R&D capabilities need to be developed. Improvements introduced in manufacturing by material and processing technologies will contribute to facilitate high productivity processes in several industrial sectors, contributing to the objective of industrialisation of the country as well as to the economic and social challenges in fields like agriculture, food and others.

RSTI would be performed to increase the national capacity for industrial production and innovation and promote science and technology to enhance industrial productivity and value-addition. RSTI would also be applied in commercial activities to ensure quality, reliability and efficiency in the delivery of goods and services in conformity with appropriate local and international standards.

1.2.2 Information and Communication Technology

ICT activities will focus on software development and applications, integration of communication networks, data processing and security of information and systems looking for applications with high impact, ensuring that industry, public sector and society are equipped with the suitable information systems. According to the IT policy analysis, Namibia is very dependent on foreign technology and skills in the ICT sector. However, an environment should be created where the cooperation of foreign and local researchers and firms assists with the development of local technology, content and the industry in general.

1.2.3 Biotechnology

Traditional Biotechnology has been practiced throughout the world for many years in Agriculture, and other industries. Modern biotechnology is an enabling technology based on the vast array of potential applications and uses that the Republic of Namibia can harness in the agricultural, public health, environmental and economic sectors and alignment them with the national development policies and priorities/ objectives. Modern biotechnology is a term adopted by international convention to refer to biotechnological techniques for the manipulation of genetic material and the fusion of cells beyond normal breeding barriers. The most obvious example is genetic engineering to create genetically modified/engineered organisms (GMOs/GEOs) through “transgenic

technology” involving the insertion or deletion of genes. It does not involve the manipulation of genetic material, but has been used to for example bake bread, brew alcoholic beverages, produce yoghurt and cheese, and in selective breeding programmes to improve livestock and crops.

Food security and food safety will be critical areas in the use of biotechnology, to develop and make useful/beneficial products. It is crucial for public awareness to be raised that Biotechnology does not equal Genetically Modified Organisms “GMOs” but rather GMOs are only part of the technologies in biotechnology. Contrary to the name “Biotechnology”, it is not a single technology rather a group of technologies working with living cells and their molecules and having a wide range of practical uses that improve our lives.

Application of biotechnology to the fields of agriculture, biomedicine, drug discovery and the environment will be promoted while complying with the national policies addressing ethical values and the safe use of biotechnology.

1.2.4 Space Science

Besides basic scientific research, application of Space Science to the fields of urban planning, agriculture & forestry, (water) resource management, navigation, national security and ICT will be promoted.

Space Science has links to many of the aforementioned areas as across-cutting and interdisciplinary research field. Obvious links exist to the areas of *agriculture and fisheries* and *water* via earth observations and *ICT* via satellite communication. But additionally, strong links exist from basic astronomical research to the areas *energy* (shared design of telescopes and solar concentrators), *health* (highly efficient light sensors for telescopes and for medical imaging), *tourism* (geographical and meteorological preferred place for steadily growing astro-tourism) and *ICT* (handling and analysis of "Big Data").