



REPUBLIC OF NAMIBIA



**IAEA**

International Atomic Energy Agency

*Atoms for Peace and Development*

# Country Programme Framework

## 2020–2025

This Country Programme Framework for the Republic of Namibia has been signed on behalf of the Government of the Republic of Namibia and the International Atomic Energy Agency

On behalf of the Government

On behalf of the International Atomic Energy Agency

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## List of Abbreviations

<b>AFRA</b>	<b>African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology</b>
<b>AERPA</b>	<b>Atomic Energy and Radiation Protection Authority</b>
<b>AMRAS</b>	<b>Advisory Mission on Regulatory Infrastructure for Radiation Safety</b>
<b>AMTA</b>	<b>Agro-Marketing and Trade Agency</b>
<b>AW-IPM</b>	<b>Area Wide-Integrated Pest Management</b>
<b>BGR</b>	<b>German Federal Institute for Geosciences and Natural Resources</b>
<b>CBPP</b>	<b>Contagious Bovine Pleuropneumonia</b>
<b>CPF</b>	<b>Country Programme Framework</b>
<b>CVL</b>	<b>Central Veterinary Laboratory</b>
<b>DRL</b>	<b>Dose Reference Level</b>
<b>DSRS</b>	<b>Disused sealed radioactive sources</b>
<b>EBS</b>	<b>Energy Balance Studio</b>
<b>FAO</b>	<b>Food and Agriculture Organisation of the United Nations</b>
<b>FMD</b>	<b>Foot and Mouth Disease</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>IAEA</b>	<b>International Atomic Energy Agency</b>
<b>IARC</b>	<b>International Agency for Research on Cancer</b>
<b>imPACT</b>	<b>Integrated mission of PACT</b>
<b>IRENA</b>	<b>International Renewable Energy Agency</b>
<b>IRRS</b>	<b>Integrated Regulatory Review Service</b>
<b>IWAVE</b>	<b>IAEA Water Availability Enhancement project</b>
<b>MAED</b>	<b>Model for Analysis of Energy Demand</b>
<b>MAWF</b>	<b>Ministry of Agriculture, Water, and Forestry</b>
<b>MESSAGE</b>	<b>Model for Energy Supply System Alternatives and their General Environmental Impacts</b>
<b>MFMR</b>	<b>Ministry of Fisheries &amp; Marine Resources</b>
<b>MHSS</b>	<b>Ministry of Health and Social Services</b>
<b>MME</b>	<b>Ministry of Mines and Energy</b>
<b>MSME</b>	<b>Medium, Small and Micro Enterprises</b>
<b>NAMWATER</b>	<b>Namibia Water Corporation</b>
<b>NAP</b>	<b>Namibia Agriculture Policy</b>
<b>NCA</b>	<b>Northern Communal Areas</b>
<b>NCCP</b>	<b>National Cancer Control Programme</b>
<b>NCDs</b>	<b>Non-Communicable Diseases</b>
<b>NDP5</b>	<b>Fifth National Development Plan</b>
<b>NEPRP</b>	<b>National Radiological Emergency Preparedness and Response Plan</b>
<b>NHRP</b>	<b>National Human Resources Plan</b>
<b>NLO</b>	<b>National Liaison Officer</b>
<b>NRPA</b>	<b>National Radiation Protection Authority</b>
<b>NSI</b>	<b>National Standard Institution</b>
<b>NST</b>	<b>Nuclear Science and Technology</b>
<b>NUST</b>	<b>Namibia University of Science and Technology</b>
<b>OIE</b>	<b>World Organisation for Animal Health</b>
<b>PGEC</b>	<b>Postgraduate Education Course in Radiation Protection and the Safety of Radiation Sources</b>
<b>QMS</b>	<b>Quality Management System</b>
<b>RASIMS</b>	<b>Radiation Safety Information Management System</b>
<b>RAIS</b>	<b>Regulatory Authority Information System</b>
<b>SDG</b>	<b>Sustainable Development Goal</b>

<b>SIMPACTS</b>	<b>Simplified Approach for Estimating Impacts of Electricity Generation</b>
<b>SIT</b>	<b>Sterile Insect Technique</b>
<b>SRS</b>	<b>Sealed radioactive sources</b>
<b>SWNM</b>	<b>Soil, water and nutrient management</b>
<b>TADs</b>	<b>Transboundary Animal Diseases</b>
<b>TC</b>	<b>Technical Cooperation</b>
<b>TCAF</b>	<b>Division for Africa, IAEA Technical Cooperation Department</b>
<b>TCP</b>	<b>Technical Cooperation Programme</b>
<b>TCPC</b>	<b>Division for Programme Support and Planning, IAEA Technical Cooperation Department</b>
<b>TSA</b>	<b>Thematic Safety Area – International Basic Safety Standards</b>
<b>UNAM</b>	<b>University of Namibia</b>
<b>UNPAF</b>	<b>United Nations Partnership Framework</b>
<b>VCF</b>	<b>Veterinary Cordon Fence</b>
<b>WASH</b>	<b>Water, sanitation and hygiene</b>
<b>WHO</b>	<b>World Health Organisation of the United Nations</b>

## EXECUTIVE SUMMARY

The Country Programme Framework (CPF) 2020 – 2025 for the Republic of Namibia was formulated according to national priorities. The CPF is aligned to the Fifth National Development Plan, which was approved in 2017, the Sustainable Development Goals and the United Nations Partnership Framework (UNPAF) 2019 – 2023.

Namibia will consolidate its utilisation of nuclear science and technology through the IAEA Technical Cooperation Programme. The priority areas have been identified as:

- Nuclear and Radiation Safety;
- Food and Agriculture;
- Human Health;
- Energy Planning;
- Water Resources Management;
- Marine and Coastal Environment;
- Human Resources Capacity Building.

During the period of this CPF, Namibia envisages to strengthen its regulatory infrastructure for safety and expand its regulatory capacity, including maintaining a regularly updated inventory of radiation sources, provide a strengthened occupational radiation protection programme, establish a programme of medical exposure control, establish a public exposure control programme and finalise the radiological emergency preparedness plan.

In the area of agriculture, the programme will focus on supporting the country to detect and monitor livestock diseases. Support will also be provided to develop improved varieties of important crops and enhance climate smart practices in soil, nutrient and water management. The feasibility of incorporating the Sterile Insect Technique (SIT) into a national programme to combat fruit flies will be assessed. The programme will also strengthen food monitoring and safety for enhanced consumer protection.

In the area of human health, the programme contributes to strengthening the country's radiotherapy service at the Windhoek Central Hospital and planning for a radiotherapy facility in the north of the country. Existing nuclear medicine services in Windhoek and Oshakati will also be strengthened.

For energy planning, the programme is designed to assist the country to complete an energy plan to enable improved decision making for the development of the energy sector.

For water resources management, the CPF envisages including isotope hydrology techniques for exploration, evaluation and monitoring of water resources.

In the marine and coastal environment, the programme will support the country to initiate a database of contaminants in coastal region. This will also contribute to food safety of fish and seafood products.

During the planning and implementation of projects associated with this CPF, due consideration will be taken to increase the participation of women in the Technical Cooperation Programme (TCP) and the protection of the environment.

Attention will also be given to implementing a national plan for higher education programmes in support of human resources capacity building in nuclear science and technology.

The proposed technical cooperation programme captured in this CPF will contribute to the attainment of Sustainable Development Goals (SDGs):

- SDG2: Zero Hunger;



- SDG3: Good Health and Well-being;
- SDG6: Clean Water and Sanitation;
- SDG7: Affordable and Clean Energy;
- SDG9: Industry, Innovation and Infrastructure.
- SDG14: Life Below Water.

## 1. INTRODUCTION

The Country Programme Framework (CPF) described in the present document constitutes the frame of reference for planning of technical cooperation between the Republic of Namibia and the International Atomic Energy Agency (IAEA) for the period 2020-2025. The preparation of this document has been a collaborative effort between the national sectoral team and personnel of the IAEA. The document identifies sector priorities for socio-economic development and provides a basis for the design and formulation of technically sound projects to address country development objectives. These priorities, contributing to the achievement of SDGs 2, 3, 6, 7, 9 and 14 have been identified from national sector strategies and policies relevant to the TC programme, including:

- Fifth National Development Plan (NDP5) 2017/2018 – 2021/2022;
- Harambee Prosperity Plan 2016 /17 – 2019/20;
- Namibia Agriculture Policy approved in 2015;
- Multi-Sectoral Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2017/2018 – 2021/2022;
- National Energy Policy 2017;
- National Aquaculture Policy 2001, Namibian Aquaculture Strategic Plan 2004, Namibia Aquaculture Master Plan 2013 – 2023;
- National Human Resources Plan 2010 – 2025;
- United Nations Partnership Framework (UNPAF) 2019 – 2023.

The current CPF (2020-2025) will build on the previous CPF (2014–2019), with specific focus on key priority areas. These include Nuclear and Radiation Safety, Food and Agriculture, Human Health, Energy Planning, Water Resources Management, and the Marine and Coastal Environment, with the cross-cutting goal of enhancing education and skills development in the field of Nuclear Science and Technology (NST). The overall aim is to enhance the contribution of the peaceful applications of NST in Namibia while at the same time creating and sustaining an environment for the safe application of this technology.

Recent assistance provided under the TCP, the 2018-2019 as approved by the IAEA Board of Governors and the proposed programme for 2020-2021 are to be found in Annex 4.

The CPF will promote the peaceful and safe uses of nuclear science and technology for socio-economic development of the country through the integration of nuclear techniques into national development plans. National technical institutions (see Annex 2) have been identified to participate in the TCP in partnership with the IAEA. These institutions fall under ministerial departments in charge of agriculture, aquaculture, health, energy, industrial development, education, research and training.

During the planning and implementation of projects associated with this CPF, due consideration will be taken to increase the participation of women in the Technical Cooperation Programme (TCP) and the protection of the environment.



## 2. SITUATION ANALYSIS

The Republic of Namibia is classified as an upper middle-income country with a Gross Domestic Product (GDP) of \$13.24 billion in 2017. This translates into GDP per capita of approximately \$5,227. The country's economy is driven by exports of mining and agricultural commodities. A modest economic growth rate has been attained over the last years.

The current CPF (2020-2025) will build on the previous CPF (2014–2019), with specific focus on key priority areas. These include Nuclear and Radiation Safety, Food and Agriculture, Human Health, Energy Planning, Water Resources Management, and the Marine and Coastal Environment, with the cross-cutting goal of enhancing education and skills development in the field of NST. The overall aim is to enhance the contribution of the peaceful applications of NST in Namibia while at the same time creating and sustaining an environment for the safe application of this technology.

Namibia joined the IAEA TC programme in 1991 and since then participated in 35 national, 76 regional and 8 interregional technical cooperation projects that have been completed. Key areas and major impact include:

- Control of animal diseases such as contagious bovine pleuropneumonia, brucellosis, foot and mouth disease;
- Development of improved crop varieties of cowpea and sorghum;
- Strengthened radiotherapy and nuclear medicine services in Windhoek;
- Establishment of a nuclear medicine facility in Oshakati.

Namibia's long-term vision is contained in Vision 2030 - "A prosperous and industrialised Namibia, developed by her human resources, enjoying peace, harmony and political stability" with a supporting vision of, "Poverty is reduced to the minimum, the existing pattern of income distribution is equitable and disparity is at the minimum".

The current CPF is aligned with the NDP5 which provides a roadmap for rapid industrialisation and infrastructure development based on the four pillars of Economic Progression, Social Transformation, Environmental Sustainability and Good Governance under the theme, "Working Together Towards Prosperity". NDP5 identifies the following "game changers":

- Infrastructure development (especially in energy and water);
- Increased productivity in agriculture, especially for smallholder farmers;
- Investment in quality technical skills development;
- Improving value addition in natural resources;
- Achieving industrial development through local procurement.

The CPF is also aligned with the Government's action plan towards prosperity for all as detailed in the Harambee Prosperity Plan 2016 /17 – 2019/20, which identifies the following five pillars:

- Effective governance;
- Economic advancement;
- Social progression;
- Infrastructure development;
- International relations and cooperation.

The TCP makes important contributions to the Harambee Prosperity Plan in the areas of social progression (improving food security, water resources provision and human health) and infrastructure development (energy planning and water resources management).

The United Nations Partnership Framework (UNPAF) 2019 – 2023, "A Partnership for the Eradication of Poverty and Inequality", is the medium-term strategic plan of the United Nations in Namibia and

represents an integrated response to supporting the people of Namibia to achieve their national priorities as set out in NDP5 and other strategies. The UNPAF is built in four Pillars:

1. Economic Progression;
2. Social Transformation;
3. Environmental Sustainability;
4. Good Governance.

The alignment of the TCP with UNPAF is described in the table below:

Pillar	Key strategic interventions identified in UNPAF to which nuclear science and technology and the TCP could contribute
<b>1. Economic Progression</b>	<ul style="list-style-type: none"> <li>• Introduction of new technological and sustainable businesses to produce innovative products based on local bush biomass, to promote value-added production and income generating activities, especially in the rural areas;</li> <li>• Strengthen the design and implementation capacities of government institutions at all levels in the area of productivity of agriculture, value chain development and food loss management; water resources management, sustainable energy production, Medium, Small and Micro Enterprises (MSMEs) development, research and innovation, and more broadly to support the country's industrialisation plans;</li> <li>• Empower vulnerable groups (youth, women, persons with disabilities and rural communities) to participate in economic activities through skills development for the informal sectors, where the most vulnerable people are likely to be employed.</li> </ul>
<b>2. Social Transformation</b>	<ul style="list-style-type: none"> <li>• Improve the nutrition status of the most vulnerable population; to support the scaling up of essential and high impact interventions that are specific and sensitive to nutrition issues; and to strengthen the enabling environment for effective action, coordination, integration and implementation of food and nutrition programmes in communities, schools and health facilities;</li> <li>• Develop a multi-sectoral approach for prevention and control of NCDs. A multisectoral approach is expected to promote a comprehensive awareness on NCDs, which will lead to lifestyle changes and hence to the reduction in risk factor.</li> </ul>
<b>3. Environmental Sustainability</b>	<ul style="list-style-type: none"> <li>• Conduct assessments and baseline studies, including vulnerability assessments, to identify those who are most vulnerable to climate and disaster risks and assess their agricultural and livelihood practices. Such assessments will inform the design of interventions aimed at building people's resilience;</li> <li>• Support the adoption of innovative approaches and technology for the sustainable utilisation of natural resources at community level: these should act as 'demonstration sites' for possible scale up or replication countrywide where appropriate;</li> <li>• Support integrated, multi-hazard risk information management across various sectors such as human mobility, nutrition, health, agriculture and food security, infrastructure, environment, education, water, sanitation and hygiene (WASH) and climate services. This will contribute to a better understanding of risks, including those arising from climate</li> </ul>



Pillar	Key strategic interventions identified in UNPAF to which nuclear science and technology and the TCP could contribute
	<p>variability and change, and will lead to more efficient and risk-informed planning and investment, securing Namibia's development gains;</p> <ul style="list-style-type: none"> <li>• Advocate to mainstream disaster risk management (DRM) and climate change mitigation and adaptation in all sectors by disseminating knowledge and producing evidence. As existing traditional and innovative knowledge are adequately transferred and used to influence policies and programmes, Namibia's natural resources will be better managed and resilient to climate and disaster risk built;</li> <li>• Build capacity to prevent, prepare for, respond to and recover from natural disasters, including those arising from climate variability and change, with a focus on local capacities. As capacities are strengthened at local level and processes decentralised, institutions will be in a better position to reduce risks, manage disasters when they occur, and support adaptive and coping strategies for current and future climate risks.</li> </ul>

Although the IAEA is not a signatory to the UNPAF, it will be included in the regular reporting mechanism so that the achievements of the TCP in Namibia may be captured within the wider UN framework.

## 2.1 LEGAL FRAMEWORK

The National Radiation Protection Authority (NRPA) was established in 2010 to administer the Atomic Energy and Radiation Protection Act, Act No. 5 of 2005. The Act provides for the regulation of all activities involving radiation sources, radioactive and nuclear material. Moreover, the primary purpose of the Act is to provide for the protection of people against the harmful effects of radiation; minimize environmental pollution that may be caused by radiological contamination; ensure the safety of facilities and radiation sources; and to ensure Namibia meet its obligations within the context of international legal instruments in the sphere of radiation or nuclear technologies.

The NRPA is reviewing the Act to incorporate gaps identified in a recent self-assessment exercise and will continue to avail itself of IAEA legislative assistance through the relevant regional projects, as may be required. Namibia will also receive further support in gaining a better understanding of the relevant international legal instruments to which it is not yet a party and which it may consider joining in the future (See Annex 3).

## 2.2 NUCLEAR AND RADIATION SAFETY

The NRPA has made medium progress in Thematic Safety Areas (TSA): TSA1 (regulatory activities), TSA2 (occupational radiation protection) and TSA3 (medical exposure control).

The regulatory infrastructure for radiation safety in Namibia needs to be strengthened. The last IAEA Integrated Regulatory Review Service (IRRS) mission was undertaken in 2008 and it is expected that an Advisory Mission on Regulatory Infrastructure for Radiation Safety (AMRAS) will be undertaken in 2020, which will define the basis for future priority interventions. In the meantime, current activities are pursued on the basis of the results of a self-assessment which was undertaken in 2018. The updated IRRS recommendations, and recommendations identified in the AMRAS mission, will be translated into an action plan for strengthening the regulatory infrastructure for radiation safety and capacity building plan to address identified gaps will be developed. Appropriate aspects of the capacity building plan could be considered for support under the TCP.



The NRPA will maintain a regularly updated inventory of radioactive sources using the Regulatory Authority Information System (RAIS) database and fully implement the authorization and inspection programmes in all facilities and activities.

The NRPA will strengthen its occupational radiation protection programme (TSA2) by pursuing certification under ISO 17025 of 2017. All occupationally exposed workers are monitored, including those monitored by the NRPA and other external services providers. The programme includes monitoring of personnel in all sectors, including medical facilities, industrial radiography, and mines.

The NRPA instituted a regular monitoring programme for radiation protection of patients (TSA3) over the previous two years. There are plans to revise the programme and evaluate the services. Studies have been initiated with IAEA assistance to evaluate medical exposure of patients within a structured medical exposure control programme, and to establish the Dose Reference Levels (DRL) of the country in line with the recommendations of the International Action Plan on Radiation Protection of Patients. The DRLs will need to be supported by quality assurance and training programmes for radiation protection in radiotherapy, nuclear medicine, diagnostic and interventional radiology.

Protection of the general public and the environment (TSA4) against exposure to harmful effects of ionizing radiation is pursued under a programme of determination of ambient doses assessment, radon concentration assessments and workplace monitoring programmes. Gamma and alpha spectroscopy laboratories have been setup to support these programmes and these will be central to the initiatives under this CPF.

An inventory of sealed radioactive sources (SRS) and disused sealed radioactive sources (DSRS) needs to be consolidated. The inventory of sealed sources has been completed. A more appropriate approach to management of orphaned sources is required. The country will consider establishing an interim storage facility while planning a central radioactive waste management facility.

A National Radiological Emergency Preparedness and Response Plan (NEPRP, TSA5) has been developed in collaboration with all local stakeholder institutions, and with technical support from the IAEA. All radiation facilities and operators have their emergency plans at facility level, reviewed and approved by NRPA as per regulations.

It is a priority of the NRPA to strengthen human resources capacity (TSA6), both in terms of number of personnel and skills. Training is crucial for the use and control of radiation sources. The country will continue to benefit in the training of radiation protection officers through the IAEA's regular Postgraduate Education Course in Radiation Protection and the Safety of Radiation Sources (PGEC). A national strategy on education and training in radiation, transport and waste safety that will address the current and future needs of training, needs to be established. This will describe an appropriate and comprehensive set of training requirements for all the categories of personnel.

With reference to the transportation of radioactive material (TSA7), Namibia has adopted the IAEA Regulations for Safety Transport of Radioactive Material. Namibia will continue to participate in the relevant regional project that support strengthening of the regulatory regime for the safe transport of radioactive material.

The country will regularly update information on its national radiation safety infrastructure in the IAEA's Radiation Safety Information Management System (RASIMS).

This programme supports the following SDGs:

SDG3: Ensure healthy lives and promote well-being for all at all ages;

SDG9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.



**Outcome Statement: Enhanced effectiveness of the regulatory body in performing its regulatory functions to protect people and the environment.**

## **2.3 FOOD AND AGRICULTURE**

The Namibia Agriculture Policy (NAP), approved in 2015, identifies three key areas for improving agricultural production: Crop production, livestock production and plant and animal health.

The NAP has the following specific objectives:

- To increase agricultural production and productivity;
- To promote investment in agricultural production;
- To promote skills development in agricultural production;
- To improve the quality of agriculture products;
- To promote food safety;
- To maintain and improve animal and plant health;
- To control and reduce the effect of pests when they occur;
- To promote agro-forestry;
- To develop and diversify agricultural production;
- To promote agricultural research and adaptation of appropriate technology
- To support stakeholders in developing their capacity to be able to meet national and export market agriculture standards as well as other technical requirements;
- To promote the sustainable utilization of resources for agricultural production;
- To contribute and support disaster preparedness;
- To contribute towards improved food and nutrition security at household and national levels;
- To contribute towards the attainment of food self-sufficiency;
- To increase income from agricultural production at household and national levels;
- To safeguard the sustainable existence of Namibia's agricultural sector.

The TCP contributes to several of the above objectives.

This aspect of the programme supports SDG2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

### **2.3.1 ANIMAL PRODUCTION AND HEALTH**

According to the NAP, "Namibia's agriculture sector consists of two types of land ownership, namely; freehold titles and non-title deed. The commercial sector covers about 44 per cent of the total land though it accommodates only ten per cent of the population while the communal sector covers about 41 per cent of the total land area and accommodates about 60 per cent of the population. Due to climatic conditions, commercial farmers are predominantly engaged in livestock farming, with small-stock dominating the activities in the south. The central and northern part of the country is more suitable for large stock production. However, international trade regulations prohibit the movement of large stock while restricting the movement of small stock and livestock products from the Northern Communal Areas (NCAs)."

In Namibia, livestock farming is an important source of animal-based food products and income, thus contributing substantially to national food security and the economy. Namibia is an important exporter of live animals (cattle, sheep, and goats) to South Africa and livestock products such as meat to European and Asian countries, and the United States of America. The country has also successfully negotiated market access opportunities for livestock products to Russia, Hong-Kong and China. There are various options to optimize livestock productivity such as development of appropriate selection criteria for improving animal nutrition, animal reproductive efficiency, and the diagnosis and control of major endemic emerging and re-emerging animal and zoonotic diseases. A strong veterinary laboratory is therefore important for the purposes of early disease detection, diagnosis, control, and certification of livestock product exports.



A Veterinary Cordon Fence (VCF) from the eastern to the western part of the country is located about 200 kilometres from the border with Angola. The VCF is mainly used for animal disease control considering that trans-boundary animal diseases such as Contagious Bovine Pleuropneumonia (CBPP) and Foot and Mouth Disease (FMD) which are present in parts of the NCAs but not on the southern side of the VCF. Therefore, the NCAs do not have access to lucrative international markets. The eradication of transboundary animal diseases (TADs) would subsequently lead to the whole country having access to international beef trade, which would contribute towards addressing socio-economic challenges. Hence, efforts towards the control of TADs need to be strengthened.

Currently some of the disease control measures under the Central Veterinary Laboratory (CVL) include: animal movement restriction/traceability; active and passive surveillance; early disease detection and reporting; and diagnostics. Previous technical support was provided under the TCP. There is a need to further strengthen the capabilities of the laboratory with specialised analytical skills, advanced diagnostic techniques and acquisition of latest advanced technologies.

The CVL is maintaining an active Quality Management System (QMS) to comply with ISO 17025. Support for further development, improvement and maintenance of the QMS in animal production and health laboratories will be needed.

**Outcome Statement: Strengthened capacity of the Central Veterinary Laboratory to detect and control priority animal and zoonotic diseases.**

### 2.3.2 CROP PRODUCTION AND IMPROVEMENT

Land degradation, as well as climate variability and change are the most significant challenges in sustainable food production and food security. In semi-arid regions of sub-Saharan Africa, soil fertility depletion and increasing water stress are the major threats to food security. In addition to its high intra- and inter-annual variability in rainfall, low (annual average of less than 300 mm) and erratic rainfall often affects crop yields. This climate variability influences the contribution of agriculture to the GDP. Moreover, the soils are fragile, mostly sandy, low inherent fertility and limited productive capacity. This needs technologies that can foster the adoption of climate smart agriculture which includes, among others, the development of improved crop varieties; and improved soil, water and nutrient management (SWNM) practices to support sustainable crop production.

In previous cycles of the TCP, the Ministry of Agriculture, Water, and Forestry (MAWF) developed mutant lines from local germplasm of cowpea (7 varieties) and sorghum (4 varieties). The projects led to the release of high yielding and drought tolerant genotypes. Characterization of the mutant lines in terms of biochemical, genotypic, phenotypic characters and nutritional values, is required. Further efforts in seed multiplication and distribution are needed to fully realise the impact of the improved crop varieties.

There is also a need to evaluate cereals crops and nitrogen fixing abilities of legume crops using isotopes techniques, potential of water and soil nutrients use efficiency, as well as their performance against biotic and abiotic stresses under local environment. In this work, the MAWF is involving students from local institutes such as the University of Namibia (UNAM) and Namibia University of Science and Technology (NUST).

The TCP will focus on:

- Developing high yielding mutant crop varieties tolerant/resistant to biotic and abiotic stresses;
- Improving nutritional quality of selected crop varieties;
- Enhancing technical and human capacity in mutation breeding and soil and water management practices;
- Determining nitrogen fixing abilities of selected legume genotypes that could enrich the soil with nitrogen in order to support staple cereals;



- Improving local indigenous vegetables and staple cereals crops through the use of mutation breeding techniques.

**Outcome Statements: Increased possibility of developing new varieties of selected crops with resistance to biotic and abiotic stresses; Improved irrigation and nutrition management for crop production.**

### 2.3.3 FOOD SAFETY

The IAEA has provided assistance to the CVL to detect heavy metals and pesticide residues in livestock products. The IAEA is currently working with the National Standard Institution (NSI) and the Agro-Marketing and Trade Agency (AMTA) in the areas of detecting heavy metals in fisheries products and mycotoxins in food and feed respectively. The national network of food safety laboratories could benefit from further IAEA support particularly for monitoring residues and contaminants and tracing food origins, as an essential element of a holistic approach to food safety. Traceability systems help prove authenticity, combat fraudulent practices and control adulteration.

Linkages will be made with the Codex Alimentarius which sets international food standards and where Namibia is a Member State. Using the established and accredited methods, national data will be generated to support national and international standards/guidelines setting. This is important for both public health and trade. The scope of hazards to be covered include veterinary drug and pesticide residues, mycotoxins and toxic metals.

**Outcome Statement: Strengthened food monitoring and safety for enhanced consumer protection.**

### 2.3.4 INSECT PEST CONTROL

Insect pests cause considerable losses, requiring the use of non-environment friendly and expensive insecticide applications and post-harvest treatments, often precluding the access of agricultural products to export markets that require products free of certain pest insects.

The Sterile Insect Technique (SIT) has the potential to make a significant contribution to the control of fruit flies. Namibia is an exporter of fresh fruit to the European Union and other regions. For example, the table grape producing areas, such as those along the Orange River, because of their isolation could be considered for the application of SIT. The integrated application of SIT has been very effective in another important table grape export area, the Hex River Valley in nearby South Africa, and is being expanded to other areas in this country. The effective integration of SIT with other suppression methods can result in significant reductions in insecticide applications and fruit rejections by importing countries and can lead to greater access to export markets that require low insecticide residues in fresh produce.

In the past years, *Bactrocera dorsalis*, a major Asian fruit fly pest reached the country and fruit production areas in Namibia need to be prepared to manage the pest. Monitoring networks and measures to facilitate early response to detections need to be established. Also, capacity development of the agricultural services staff dealing with surveillance and suppression should be addressed.

Under the regional TC programme, the IAEA has provided preliminary assistance to the MAWF to explore the inclusion of SIT in a national programme to manage *Bactrocera dorsalis* fruit fly. The programme will focus on assisting the country to carry out a full feasibility on the possibility of using SIT as a component of Area Wide-Integrated Pest Management (AW-IPM).

**Outcome Statement: Enhanced possibility of evidence-based decision-making on incorporating SIT into national fruit fly suppression programmes.**



## 2.4 HUMAN HEALTH

The Ministry of Health and Social Services (MHSS) developed the Multi-Sectoral Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2017/2018 – 2021/2022 outlining the national response to combat non-communicable diseases (NCDs), which are of growing public health concern. including the most common NCDs in Namibia such as cardiovascular diseases, hypertension, stroke, congestive cardiac failure and other cardio myopathies, diabetes-mellitus, cancer, chronic respiratory diseases (chronic obstructive pulmonary diseases and asthma), trauma and injuries, as well as mental illnesses.

With regard to cancer, an imPACT Review to Namibia was conducted in November 2010 and January 2011. In early 2016, the MHSS requested IAEA support for the development of its National Cancer Control Programme (NCCP). Expert advisory services were made available throughout 2016 and early 2017 in close cooperation with partners. The NCCP was finalized in 2018.

This aspect of the programme responds to SDG3: Ensure healthy lives and promote well-being for all at all ages.

### 2.4.1 RADIOTHERAPY

The population of Namibia is currently estimated to be 2.6 million. The International Agency for Research on Cancer's (IARC) GLOBOCAN database (including data from Namibian Cancer Registry) has estimated that in 2018 there were 2,200 new cancer cases (1,047 in men and 1,153 in women) and 1,238 cancer deaths (632 in men and 606 in women).

Overall, the most frequent cancers are breast (14.5%), Kaposi sarcoma (12.6%), cervical (10.7%) and prostate (9.4%). By 2030, Namibia will face an estimated incidence of 3,210 new cases representing an increase of over 40 per cent compared to 2018.

Currently, not all patients receive timely and effective radiotherapy treatment due to insufficient capacity. There is one public radiotherapy facility located in the Windhoek Central Hospital that caters for 80% of the population from all parts of the country. The facility treats approximately 1000 patients per year. Some patients are referred to a private radiotherapy facility.

The Oshakati State Hospital is a referral hospital which serves a population of more than 800,000, which is close to 50% of the national population. There are diagnostic capabilities available, including nuclear medicine, but patients that are diagnosed with cancer are referred to the radiotherapy facility in Windhoek, which is about 800 km away. This means that all patients that are referred to Windhoek Central Hospital (about 60% of all patients that receive radiotherapy treatment) are accommodated as inpatients. This represents additional costs for the Government, as well as patients and their families.

The MHSS is planning to (i) establish a new radiotherapy facility at the Oshakati State Hospital and (ii) expand the capabilities at the Windhoek Central Hospital. It is anticipated that this will significantly increase access to radiation treatment and, in the long run, reduce cancer mortality, and contribute to the overall target of 30% reduction in cancer mortality by 2030, an important contributor to SDG targets.

In 2018, the IAEA supported Namibia in finalizing a "bankable" document (funding proposal) for the establishment of a radiotherapy facility at the Oshakati State Hospital and the expansion of cancer treatment capabilities at the Windhoek Central Hospital. The proposal is being presented to internal and external partners.

While the Government is securing funds and initiating the expansion projects, further cooperation with the IAEA is required to strengthen the human resources available to the radiotherapy facility at



the Windhoek Central Hospital, including long-term fellowship training for key personnel - radiation oncologists, medical physicists and radiation therapy technologists (RTTs) as needed.

**Outcome Statement: Increased access of cancer patients to quality treatment.**

#### 2.4.2 NUCLEAR MEDICINE

There are currently four nuclear medicine facilities in Namibia, two in the private sector and two in the public sector. These facilities, especially those in the public sector at the Windhoek Central Hospital and the Oshakati State Hospital, are facing challenges in terms of the availability of human resources, secure supply of radioisotopes and maintenance of equipment. The IAEA will consider further support to these facilities in terms of training key professionals. The development of local education programmes in nuclear medicine will be explored.

**Outcome Statement: Increased access to quality nuclear medicine imaging for a number of pathologies.**

### 2.5 ENERGY PLANNING

The Ministry of Mines and Energy (MME) released the National Energy Policy in 2017 which states that, "Namibia's energy sector comprises formalised electricity, upstream oil and gas, and downstream liquid fuels subsectors, as well as the less formalised downstream gas and thermal energy subsectors. Renewable energies are integrated into the electricity/thermal subsectors, as per their specific roles. The country's energy sector is dominated by liquid fuels which accounted for some 58% of all energy consumed in 2014, while electricity as well as biomass accounted for some 20% each, with the remainder in the form of coal and liquid petroleum gas. Throughout the past decade, the country's total energy consumption grew by some 3% per annum, while electricity consumption has increased by an average annual rate of some 4.1%. During the last five years, the Namibian economy has grown by an average of 5.5% per annum." The policy envisages emphasises the need for development of local generating capacity and the importance of improving access to energy for households, rural businesses and institutions.

The IAEA has thus far provided limited assistance to the national team under the leadership of the MME to use the following models in the process of developing a national energy plan:

- Energy Balance Studio (EBS) methodology for compiling energy data and balances. This approach follows the International Recommendations for Energy Statistics developed by UN Statistics Division;
- Model for Analysis of Energy Demand (MAED) to analyse energy demand scenarios;
- Model for Energy Supply System Alternatives and their General Environmental Impacts (MESSAGE) to analyse energy supply options;
- Simplified Approach for Estimating Impacts of Electricity Generation (SIMPACTS) for estimating environmental impacts of electricity generation.

Further IAEA support is required to address the following:

- Enhance the institutional framework for energy data collection and capacities to analyse data;
- Due to important interlinkages between energy, water (through hydropower) and climate systems (through vulnerabilities related to climate change), capacities for making an integrated assessment of different resource systems is desirable. This approach places energy planning within the broader development context and complements other policy goals;
- Enhance capacity to regularly review and update models and energy plans for informed decision making;
- Involvement of academic and research institutions for enhanced sustainability and capacity building. The adoption of appropriate curricula for local training in energy planning tools will be explored.



The Government will consider producing an Integrated Resource Plan using the above assistance.

This aspect of the programme responds to SDG7: Ensure access to affordable, reliable, sustainable and modern energy for all.

**Outcome Statement: Increased energy planning capacities allow improved decision making for the development of the energy sector.**

## 2.6 WATER RESOURCES MANAGEMENT

In a country as dry as Namibia, water resources are often scarce, and supply is unreliable. Surface water availability is closely linked to rainfall patterns that are inconsistent in both time and space. Perennial rivers occur only along the borders, and ephemeral rivers in the interior of the country. The average annual precipitation is 350mm. Coupled with high evaporation rates, results in reduced amounts of available water inland. The Namibian population depends largely on groundwater for water supply, livestock and game farming, irrigation water for crop production and industrial use.

Namibia is a semi-arid country, where higher than average rainfall events substantially recharge the aquifers. Due to climate variability and changes however, such intense rainfall events occur sparingly, equating directly to variable and/or limited recharge of aquifers. This has resulted in increased water scarcity and reduced water security. Groundwater resources across the country are fully committed to the consumer and in some cases are under stress. This is the case for major aquifers in the country where groundwater reserves are supplying the fast-growing population and industry. Over-abstraction of the groundwater from these aquifers has increased the likelihood of complications such as sea-water intrusion and reduced water quality.

The Namibian Government is committed, under its national development programmes, to the provision of freshwater resources and the security of supply. Under the Harambee Prosperity Plan and NDP5, the Government committed itself to Namibia having sustainable production and consumption of water resources resulting in improved access to safe drinking water for human consumption and for industrial use, by 2022. Therefore, groundwater resources should be protected and managed in a manner that achieves these goals and outputs while promoting social equity. Without a full understanding of this resource and its future dynamics, it will be hard to inform policy makers and government in a way that sustains social equity. Hence, support from the IAEA is foreseen as an integral and complementary part of Namibia's efforts to address water issues.

The TCP previously built capacity to use isotope hydrology techniques within the Geohydrology Division, Department of Water Affairs of the Ministry of Agriculture, Water and Forestry (MAWF). Capacity for stable isotope analysis was established at UNAM. Continued efforts should be made to consolidate and expand this capacity.

IAEA support will be considered in terms of the IAEA Water Availability Enhancement (IWAVE) programme methodology whereby a rigorous gap analysis is undertaken to identify capacity building requirements to integrate isotope hydrology into the characterisation, management, monitoring and sustainable exploitation of water resources. The potential for strengthening laboratory services will also be assessed.

Sites of high hydrogeological interest will be selected for the application of isotope techniques through the systematic collection and analysis of water samples for stable isotopes. In this way, the impact of climate change and variability on groundwater resources can be better understood and the groundwater resource reserves of major aquifers better estimated.

This aspect of the programme is linked to SDG6: Ensure availability and sustainable management of water and sanitation for all and SDG 13: Take urgent action to combat climate change and its impacts.



**Outcome statement: Enhanced evidence-based decision-making for improving the management and protection of water resources.**

## **2.7 MARINE AND COASTAL ENVIRONMENT**

The Ministry of Fisheries and Marine Resources (MFMR) is the lead agency for aquaculture in Namibia and has since 2001 created an enabling environment for this sector to sustainably develop. Aquaculture is making a significant contribution to the economic development in Namibia, as reflected in key strategic documents such as NDP5. Aquaculture development is guided by the National Aquaculture Policy (2001), the Aquaculture Act (2000) and the Namibian Aquaculture Strategic Plan (2004) – all of which promote and regulate the aquaculture industry to ensure the sustainable utilization of available resources as well as the protection and conservation of marine and inland aquatic ecosystems.

The MFMR has developed a Master Plan (2013-2023) to direct aquaculture development in Namibia for fresh and marine waters. The key actions identified are the implementation of the National Shellfish Sanitation Programme; promotion of environmental sustainability and the creation of an enabling legislative, regulatory and policy environment which emphasises the national need for the improvement and enhancement of the current Water Quality Monitoring Programme; the establishment of a National Aquatic Animal Health and Biosecurity Plan and the establishment of Radiation Management Plans (RMPs) in research laboratories.

Other measures to protect the marine and freshwater environment include environmental monitoring, environmental impact assessments, research, and standards setting. Responsible aquaculture requires the development of standards for aquaculture practices and animal health, certification systems for the health and safety of aquaculture food products, and the quality of seeds and feeds.

Programmes that can assess subtle climate change impacts such as ocean warming, ocean acidification or the frequency and intensity of harmful algal bloom events can also be developed using IAEA's nuclear and isotopic techniques. IAEA support will also be sought to promote adoption of international standards and best practices in marine environment monitoring.

In previous years the IAEA assisted the MFMR to establish laboratory capacity for monitoring harmful algal blooms and monitoring marine pollution. Further IAEA assistance will be needed to build technical capacity in nuclear and nuclear related techniques to analyse and establish a database for heavy metals, radioactive and organic contaminants in sea-water, sediments and biota in territorial waters. It should be noted that synergies exist between this section and Section 2.3.4 "Food Safety" above.

This aspect of the programme is linked to SDG2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture; SDG 13: Take urgent action to combat climate change and its impacts; and SDG14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

**Outcome statement: Enhanced national capacity for contaminant monitoring of marine products for the protection of consumers.**

## **2.8 HUMAN RESOURCES CAPACITY BUILDING**

Since Independence, Namibia has attached priority to addressing the acute shortage of human resources needed for its development agenda. This is viewed as a major constraint to social and economic development of the country. The National Planning Commission (NPC) has formulated a comprehensive National Human Resources Plan (NHRP) 2020 - 2025 and National Development Plans have facilitated its implementation.



In science and technology, the unavailability of human resources is even more acute. Nuclear science and technology can play a significant role in realizing the objectives set out in Namibia's National Development Plans and Vision 2030 as its cross-cutting nature is relevant for developing programmes in agriculture, human health, energy planning, water resources and the environment. Appropriate human resource capacity building programmes are required. It is also recognised that such programmes provide an excellent opportunity for gender mainstreaming and equality in science and technology education.

There is currently insufficient infrastructure or capacity to develop Namibia's own human resources in the fields of nuclear science and technology. For nuclear science and technology to make a measurable difference in development efforts, a strategy must be adopted to ensure that these technical applications are integrated into national programmes and activities that seek to address national development priorities. This national strategy should be developed with collaboration between the lead Ministries/Agencies and institutions of higher learning to ensure that the human resources output is relevant and addresses the need of the market.

An innovative human resource strategy for nuclear science and technology is being pursued. Traditionally, training for staff under the TCP is provided for recruited personnel, educated to at least graduate level. There is a need to create a human resources pipeline to ensure a constant supply of nuclear science and technology graduates. The IAEA has assisted Namibia to draw up a business plan to establish a Nuclear Science and Technology Research Centre. The overall purpose of the Centre will be to enhance the contribution of nuclear sciences and applications to sustainable development objectives with the following specific objectives to:

- Strengthen national research and development capacities to address agricultural productivity and food security, improving of human health, increase availability of water resources, assess, and manage of the marine and terrestrial environments and industrial applications using radioisotopes and radiation technology;
- Serve as the principal focal point for advising the Government on all matters pertaining to beneficial application of nuclear technology for the integration of these into national developmental plans;
- Ensure that benefits of potential nuclear applications are known and understood by relevant sectorial units of Government, universities and scientific institutions, and end-users;
- Serve as a resource centre for knowledge about nuclear applications and advice on the appropriate technological advances, innovations and feasibility of nuclear related projects in the context of National Developmental Plans;
- Serve as the interface between the Government's institutions of higher learning, industry, and international organisations and bilateral partners on all matters related to planning, programming, programme implementation, monitoring and evaluation of nuclear science projects;
- Provide technical backstopping to institutions using nuclear techniques in their programmes, as well as to support institutions of higher learning and industry with emphasis on project management, analytical services, calibration services, irradiation services, and capacity building;
- Serve as a networking platform with UN agencies, donors and other stakeholders to form alliances and partnerships in development activities that can leverage new resources to address national priorities.

As the enabler of the use of nuclear science and technology, the Centre should be at the forefront of facilitating and coordinating with stakeholders to ensure that the strategy is developed and implemented. It would require that the Centre cooperates with national, regional and international partners to create an enabling framework for education and training in nuclear science and technology.



To date, the Government has allocated land for the Centre. Much more needs to be done in terms of resource mobilisation.

In the interim, the TCP has assisted UNAM and NUST to strengthen curricula and laboratories for nuclear science and technology education at graduate level. Personnel identified to serve as lecturers have been awarded long-term fellowships to obtain the required qualification and degrees. Further strengthening of laboratory capacity and human resources is required.

This aspect of the programme is linked to SDG9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

**Outcome Statement: Enhanced institutional capacities to human resources capacity building programmes in nuclear science and technology.**





### 3. RESULTS FRAMEWORK

#### 3.1 NUCLEAR AND RADIATION SAFETY

Outcome	Baseline data	Indicator	Means of Verification	Assumptions/Risks	
Enhanced effectiveness of the regulatory body in performing its regulatory functions to protect people and the environment	RASIMS inputs as at December 2019	New regulations, standards and codes of practice endorsed by authorities by December 2025; Inventory of radioactive sources updated and regularly maintained (ongoing); An Integrated Management System for the Regulatory Body in place by 2021; National Dose Registry established by 2022; Expanded number of occupationally exposed workers monitored (ongoing); Establish DRLs by 2023; Public exposure control programme, including a strategy for radioactive waste management, established by 2023; National Strategy on education and training in radiation, transport and waste safety established by 2022	Government documentation	Government will prioritise resources to strengthen the independent regulatory body	
Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Inventory of radioactive sources maintained	2020 - 2025	NRPA	Expert services (10,000)	0	10,000
Occupational exposure control system expanded	2020 - 2023	NRPA	10,000 Procurement of equipment (50,000) and training of staff (20,000)		140,000
Medical exposure control programme expanded	2020 - 2025	NRPA	70,000 Procurement of equipment (50,000) and training of staff (20,000)	0	70,000
			70,000		70,000

### 3.1 NUCLEAR AND RADIATION SAFETY

Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Public exposure control programme including radioactive waste management strategy initiated	2020 - 2025	NRPA	Procurement of equipment (50,000) and training of staff (20,000)	0	70,000
			<b>70,000</b>		
Environmental monitoring programme implemented	2020 - 2025	NRPA	Procurement of equipment (50,000) and training of staff (20,000)	0	70,000
			<b>70,000</b>		
National Strategy on education and training in radiation, transport and waste safety established	2022 - 2023	NRPA	Expert services (10,000)	0	10,000
			<b>10,000</b>		
Transportation of radioactive materials regulated	2022 - 2025	NRPA	Expert services (40,000)	0	40,000
			<b>40,000</b>		
			<b>Radiation Safety and Security Subtotals</b>		
			Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
			<b>€340,000</b>	<b>€0</b>	<b>€340,000</b>



### 3.2 FOOD AND AGRICULTURE

Outcomes	Baseline data	Indicator	Means of Verification	Assumptions/Risks
Strengthened capacity of the Central Veterinary Laboratory to detect and control priority animal and zoonotic diseases;	The current number of animal diseases reported to the OIE by the Central Veterinary Laboratory;	Immunological and molecular diagnostic technologies established for selected diseases important for moving the VCF northwards;	Expert and counterpart reports	Favourable environmental conditions for performing field experiments with mutant populations;
Increased possibility of developing new varieties of selected crops with resistance to biotic and abiotic stresses;	Varieties suitable for mutation induction already available in the country;	At least 30 advanced mutant varieties of selected crops are available by December 2025;		Government will implement systematic, multi-institutional monitoring programmes for food hazards
Improved irrigation and nutrition management for crop production;	Existing accredited analytical procedures in place for food safety;	Soil, water and nutrient management package (including supplementary irrigation facilities) to further increase yield by 15% available to farmers by 2025;		Government will implement recommendations of feasibility study on incorporating SIT into national fruit fly suppression programme
Enhanced possibility of evidence-based decision-making on incorporating SIT into national fruit fly suppression programmes;	Existing data on residues and contaminants in food; SIT not yet included in national fruit fly suppression programme	New internationally accredited analytical procedures in place for food safety;		
Strengthened food monitoring and safety for enhanced consumer protection.		Feasibility study on incorporating SIT into national fruit fly suppression programme submitted to Government by 2024		

  

Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Strengthened national laboratory capacity to detect and control transboundary animal and zoonotic diseases	2020-2025	MAWF, CVL, Ondangwa Regional Laboratory	Fellowship training on serology and molecular techniques, expert missions and laboratory equipment and consumables (300,000)	100,000 (NAM5018)	200,000
			300,000		
Mutant lines of selected crops with desired traits developed and confirmed	2020 - 2025	MAWF, Mannheim Station, UNAM, NUST	Fellowship training on mutation induction and detection, expert missions and laboratory equipment and consumables (300,000)	100,000 (NAM5017)	200,000
			300,000		

### 3.2 FOOD AND AGRICULTURE

				Resources	
				Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant counterpart(s)/ institution(s)	national Research	Approximate Cost in € (A)	
Improved irrigation management systems for crop production in place	2020-2025	MAWF, Mannheim Station, UNAM, NUST	Fellowship training on using nuclear techniques in soil and water management expert missions and laboratory equipment and consumables (300,000)	100,000 (NAM5017)	200,000
				300,000	
Competencies of laboratories on monitoring food safety (chemical contaminants), pesticides and metallic elements residues through use of nuclear and isotopic techniques so as to meet national and international market requirements strengthened	2020 - 2025	MAWF, CVL	Training, expert services and procurement of equipment and reagents (300,000)	100,000 (NAM5018)	200,000
				300,000	
Feasibility study on incorporating SIT into national fruit fly suppression programme completed	2020 - 2022	MAWF	Expert services (20,000)		20,000
				20,000	
Food and Agriculture Subtotals				Resources	
				Approximate Cost in € (A)	Resources currently available in € (B)
				€1,220,000	€400,000
					€820,000



### 3.3 HUMAN HEALTH

Outcomes	Baseline data	Indicator	Means of Verification	Assumptions/Risks	
Increased access of cancer patients to quality treatment;	Current status of radiotherapy services at Windhoek Central Hospital as at December 2019;	Number of cancer patients receiving radiotherapy;	Government documentation, expert and counterpart reports	Radiotherapy facilities are expected to operate within the NCCP;	
Increased access to quality nuclear medicine imaging for a number of pathologies.	Current status of nuclear medicine services at Windhoek Central Hospital and Oshakati State Hospital as at December 2019;	Number of patients receiving nuclear medicine imaging; Number of long-term fellowships related to strengthening radiotherapy and nuclear medicine facilities awarded;		Government will secure funds and initiate expansion of the radiotherapy facilities at Windhoek Central Hospital; Government will secure funds and initiate the establishment of a radiotherapy facility at Oshakati State Hospital; The IAEA will focus its support on capacity building through long-term fellowships	
Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Qualified professionals available to serve in existing radiotherapy and nuclear medicine services and in the envisaged expanded/new facilities	2020-2025	MHSS, Windhoek Central Hospital, Oshakati State Hospital	Long-term fellowships (300,000)	130,000 (NAM6013)	170,000
			300,000		
Human Health Subtotals					
			Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
			€300,000	€130,000	€170,000

### 3.4 ENERGY PLANNING

Outcomes	Baseline data	Indicator	Means of Verification	Assumptions/Risks
Increased energy planning capacities allow improved decision making for the development of the energy sector	National Energy Policy 2017; Existing energy data as at December 2019	Integrated Resource Plan developed by 2024 using IAEA energy planning tools	Government documentation, expert and counterpart reports	Government will endorse the recommendations emanating from the energy plan
<b>Indicative Outputs</b>	<b>Indicative Timeframe (Future TC cycle)</b>	<b>Relevant counterpart(s)/ institution(s)</b>	<b>Approximate Cost in € (A)</b>	<b>Resources currently available in € (B)</b>
Integrated Resource Plan completed	2020 -2024	MME and other institutions participating in the national energy planning team including Namibia Energy Institute, Namibia Statistic Agency, Electricity Control Board, National Utility	Expert services and training related to IAEA energy planning models (200,000)  200,000	200,000
<b>Energy Planning Subtotals</b>				
		<b>Resources currently available in € (B)</b>	<b>Resources to be identified/mobilised in € (A-B)</b>	
		Approximate Cost in € (A)		
		€200,000	€0	€200,000



### 3.5 WATER RESOURCES MANAGEMENT

Outcomes	Baseline data	Indicator	Means of Verification	Assumptions/Risks	
Enhanced evidence-based decision-making for improving the management and protection of water resources	Existing surface and groundwater data and reports	IWAVE gap analysis submitted to Government by 2022; Groundwater at selected sites characterised and recommendations on managing them submitted to Government by 2025 Climate change modelling using isotopic data established by 2024	Government documentation, expert and counterpart reports	Government will adopt the capacity building plan emanating from the IWAVE gap analysis	
	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Gap analysis and resulting capacity building plan for characterisation, management, monitoring and sustainable exploitation of groundwater resources, finalised	2020-2022	Geohydrology Division, Department of Water Affairs and Forestry of the MAWF, Namibia Water Corporation (NAMWATER); UNAM, NUST, MME	Expert services (40,000)	40,000 (NAM7002)	0
Selected sites of high hydrogeological interest characterised through the systematic collection and analysis of water samples for stable isotopes	2020-2025	Geohydrology Division, Department of Water Affairs and Forestry of the MAWF, Namibia Water Corporation (NAMWATER); UNAM, NUST, MME	Expert services on study design, sampling and data interpretation, support to sample analysis, small items of equipment and consumables (300,000)	120,000 (NAM7002)	180,000
				300,000	
Water Resources Management Subtotals					
			Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
			€340,000	€160,000	€180,000

### 3.6 MARINE AND COASTAL ENVIRONMENT

Outcomes	Baseline data	Indicator	Means of Verification	Assumptions/Risks	
Enhanced national capacity for contaminant monitoring of marine products for the protection of consumers	Existing data on contaminant levels in the coastal region	Database of heavy metal, radioactive and biological contaminants in sea-water sediments and biota	Government documentation, expert and counterpart reports	An appropriate monitoring network in the coastal region will be established	
Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	<sup>1</sup> Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Database of heavy metal, radioactive and biological contaminants in sea-water sediments and biota in territorial waters initiated	2022-2025	MFMR	Expert services (30,000) Equipment (170,000) Fellowships (100,000)	0	300,000
300,000					
Marine and Coastal Environment Subtotals					
Resources			Resources to be identified/mobilised		
Approximate Cost in € (A)			Resources currently identified/mobilised in € (B)		
€300,000			€0		
			€300,000		



### 3.7 HUMAN RESOURCES CAPACITY BUILDING

Outcomes	Baseline data	Indicator	Means of Verification	Assumptions/Risks	
Enhanced institutional capacities to human resources capacity building programmes in nuclear science and technology	Existing university courses related to nuclear science and technology; Existing facilities which can also be used for training university students	University laboratory facilities, curricula and human resources strengthened by 2025	Government documentation, expert and counterpart reports	The Government will proceed with its plans to establish a Nuclear Science and Technology Research Centre	
Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	<sup>1</sup> Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
University laboratory facilities, curricula and human resources strengthened	2022-2025	UNAM, NUST, Atomic Energy and Radiation Protection Authority (AERPA)	Expert services for curriculum development (20,000) Equipment (80,000) Fellowships (100,000)	0	200,000
200,000					
Human Resources Capacity Building Subtotals					
			Resources currently available in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
			€200,000	€0	€200,000

### 3.8 RESOURCES SUMMARY TABLE

Thematic Area	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Nuclear and Radiation Safety	340,000	0	340,000
Food and Agriculture	1,220,000	400,000	820,000
Human Health	300,000	130,000	170,000
Energy Planning	200,000	0	200,000
Water Resources Management	340,000	120,000	180,000
Marine and Coastal Environment	300,000	0	300,000
Human Resources Capacity Building	200,000	0	200,000
	<b>Total estimated overall cost for CPF</b>	<b>Total estimated resources available for CPF</b>	<b>Total resources to be identified/mobilised</b>
	€2,900,000	€650,000	€2,250,000
	(=)		(=)

The above stated figures are indicative. Signing of the CPF by the Agency does not commit to funding of the CPF implementation by the Member State or the IAEA, nor does it suggest the expectation of continued levels of Agency funding. The main purpose is to assist planning and prioritization of the country framework.



## 4. PROGRAMME IMPLEMENTATION AND SUPPORT

### 4.1 CPF COORDINATION AND FUTURE REVIEW

The Country Programme Framework (CPF) described in the present document constitutes the frame of reference for planning of technical cooperation between the Republic of Namibia and the International Atomic Energy Agency (IAEA) for the period 2020-2025. The preparation of this document has been a collaborative effort between the national sectoral team and personnel of the IAEA.

The implementation of this CPF will be coordinated and monitored by the Directorate Atomic Energy and Radiation Protection Authority (AERPA) under the auspices of the Ministry of Health and Social Services as the institution hosting the National Liaison Officer (NLO) office, and the Division for Africa (TCAF) at the IAEA Department of Technical Cooperation. Inputs from other institutions and/or organizations at the national level may be sought as necessary. TCAF may also request inputs from the IAEA Technical Divisions, the TC Division for Programme Support and Planning (TCPC), and/or external expertise for the implementation, coordination, monitoring and evaluation of this CPF.

The AERPA is the national focal point for nuclear energy and related matters in the sphere of the IAEA's mandate. The Director of the AERPA acts as the National Liaison Officer. The AERPA consults on a regular basis with stakeholders and serves to facilitate the implementation of IAEA supported TC projects as defined in the CPF.

A process to review progress and update the CPF based on evolving development priorities at the national level will be conducted three years after signature of this document. TCAF and the NLO Office will lead this process, seeking support from other stakeholders as necessary. The review process should include consideration of any significant changes (positive or negative) that have affected the programme and how they have affected implementation.

### 4.2 PARTNER COORDINATION

Namibia became a member of the United Nations in 1990. As a member of the UN, Namibia adopted the 2030 Agenda for Sustainable Development with the SDGs at its core. These make clear that inclusive, strategic and mutually beneficial partnerships are a prerequisite to achieving the SDGs.

The United Nations Partnership Framework (UNPAF) 2019 – 2023, “A Partnership for the Eradication of Poverty and Inequality”, is the medium-term strategic plan of the United Nations in Namibia and represents an integrated response to supporting the people of Namibia to achieve their national priorities as set out in NDP5 and other strategies. The UNPAF is built in four Pillars:

1. Economic Progression;
2. Social Transformation;
3. Environmental Sustainability;
4. Good Governance.

Please see Chapter 2 above for a detailed analysis of the alignment of the TCP with the UNPAF. Although the IAEA is not a signatory to the UNPAF, it will be included in the regular reporting mechanism so that the achievements of the TCP in Namibia may be captured within the wider UN framework.

Potential national and international partners for the implementation of the proposed TC programme are listed in the Partnership Framework contained in Annex 1.





## ANNEX 1: PARTNERSHIP FRAMEWORK

Thematic Area	Outcome in national Policy and strategies	CPF Outcomes	Links with SDGs	Links with UNPAF 2019-2023 Outcomes	Relevant Partners
<b>Nuclear and Radiation Safety</b>		Enhanced effectiveness of the regulatory body in performing its regulatory functions to protect people and the environment	SDG 3 SDG 9	Pillar 4: Good Governance Outcome 4.1. By 2023, government institutions at national and regional level are accountable and transparent engaging citizens in participatory decision-making processes	National: NRPA
<b>Food and Agriculture</b>	<p>Pillar: Economic progression: Outcome: By 2022, the rural quality of life and socio-economic well-being has improved with rural poverty declining from 37% in 2010 to 25%.</p> <p>By 2022, the proportion of food insecure individuals has dropped from 25% in 2016 to 12% and food production has increased by 30% cumulatively over the NDP5 period.</p> <p>Overall goals of National Agriculture Policy:</p> <ul style="list-style-type: none"> <li>• Create a conducive environment for increased and sustained agriculture production and productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthened capacity of the Central Veterinary Laboratory to detect and control priority animal and zoonotic diseases;</li> <li>• Increased possibility of developing new varieties of selected crops with resistance to biotic and abiotic stresses;</li> <li>• Improved irrigation and nutrition management for crop production;</li> <li>• Enhanced possibility of evidence-based decision-making on incorporating SIT into national fruit fly suppression programmes;</li> <li>• Strengthened food monitoring and safety for enhanced consumer protection.</li> </ul>	SDG 2	<p>Pillar 1: Economic Progression Outcome 1.1. By 2023, institutions implement policies for inclusive development and poverty reduction for vulnerable groups.</p> <p>Pillar 3: Environmental Sustainability and Natural Resources Management Outcome 3.1. By 2023, vulnerable populations in disaster prone areas and biodiversity sensitive areas are resilient to shocks and climate change effects and benefits from natural resources management.</p>	<p>National: MAWF, Central Veterinary Laboratory, Ondangwa Regional Laboratory, Mannheim Research Station, UNAM, NUST, NSI, AMTA</p> <p>International: FAO, OIE (World Organisation for Animal Health)</p>

Thematic Area	Outcome in national Policy and strategies	CPF Outcomes	Links with SDGs	Links with UNPAF 2019-2023 Outcomes	Relevant Partners
	<ul style="list-style-type: none"> <li>Accelerate the agriculture sector contribution to National Growth Domestic Product</li> <li>Promote development of national agriculture sector across the value chain</li> </ul>				
<b>Human Health</b>	<p>Pillar: Social transformation</p> <p>Outcome: By 2022, Namibia's Health Adjusted Life Expectancy has improved from 58 to 67.5 years.</p>	<ul style="list-style-type: none"> <li>Increased access of cancer patients to quality treatment;</li> <li>Increased access to quality nuclear medicine imaging for a number of pathologies.</li> </ul>	SDG3	<p>Pillar 2: Social Transformation</p> <p>Outcome 2.1. By 2023, most vulnerable women, children, adolescents and young people in Namibia have access to and utilize quality integrated health care and nutrition services</p>	<p><u>National:</u> MHS, Windhoek Central Hospital, Oshakati State Hospital</p> <p><u>International:</u> WHO IARC</p>
<b>Energy Planning</b>	<p>Pillar: Economic Progression</p> <p>Outcome: By 2022, Namibia has a sustainable mix of locally generated energy capacity of 755 MW to support household and industry development.</p>	Increased energy planning capacities allow improved decision making for the development of the energy sector	SDG 7	Outcome 2.4. By 2023, the most vulnerable children, people living with disabilities, marginalized people, and poor utilize quality, integrated social protection services	<p><u>National:</u> MME and other institutions participating in the national energy planning team including Namibia Energy Institute Namibia Statistic Agency, Electricity Control Board, National Utility</p> <p><u>International:</u> IRENA</p>



Thematic Area	Outcome in national Policy and strategies	CPF Outcomes	Links with SDGs	Links with UNPAF 2019-2023 Outcomes	Relevant Partners
<b>Water Resources Management</b>	<p>Pillar: Economic Progression</p> <p>Outcome: By 2022, Namibia has a sustainable production and consumption of water resources resulting in improved access to safe drinking water for human consumption and for industry use. Each rural constituency will have water access above 50%.</p>	Enhanced evidence-based decision-making for improving the management and protection of water resources	SDG 6		<p><u>National:</u> Geohydrology Division, Department of Water Affairs and Forestry of the MAWF, Namibia Water Corporation (NAMWATER); UNAM, NUST, MME</p> <p><u>International:</u> UNESCO, German Federal Institute for Geosciences and Natural Resources (BGR)</p>
<b>Marine and Coastal Environment</b>	<p>Pillar: Environmental Sustainability</p> <p>Outcome: By 2022, Namibia is sustainably managing her natural resources.</p>	Enhanced national capacity for contaminant monitoring of marine products for the protection of consumers	SDG 2 SDG 13 SDG 14	Pillar 3: Environmental Sustainability and Natural Resources Management Outcome 3.1. By 2023, vulnerable populations in disaster prone areas and biodiversity sensitive areas are resilient to shocks and climate change effects and benefits from natural resources management	<p><u>National:</u> MFMR</p>
<b>Human resources capacity building</b>	<p>Pillar: Social transformation</p> <p>Outcome: By 2022, Namibia has put in place an education system that responds to industrial needs.</p>	Enhanced institutional capacities to launch training programmes in nuclear science and technology.	SDG 9		<p><u>National:</u> UNAM, NUST, AERPA</p>





## ANNEX 2: LIST OF PARTICIPATING INSTITUTIONS

Field	Institution	Roles and responsibilities
Programme Management	AERPA, MHSS	NLO Office
Legal framework, nuclear and radiation safety	NRPA, MHSS	Regulatory body
Animal production and health	MAWF, CVL, Ondangwa Regional Laboratory	Counterpart institutions, laboratory services for testing and diagnosis of transboundary and zoonotic diseases
Crop production and improvement, soil and water management	MAWF, Mannheim Research Station, UNAM, NUST	Counterpart institutions for crop production and improvement, soil and water management
Insect and Pest Control	MAWF	Counterpart institution for SIT against fruit fly
Food safety	MAWF, CVL, NSI, AMTA	Counterpart institution, laboratory services for food safety testing
Radiotherapy and nuclear medicine	MHSS, Windhoek Central Hospital, Oshakati State Hospital	Counterpart institutions, venues for radiotherapy and nuclear medicine facilities
Energy planning	MME, Namibia Energy Institute, Namibia Statistic Agency, Electricity Control Board, National Utility	Counterpart institutions contributing to developing national energy plans
Water resources management	Geohydrology Division, Department of Water Affairs and Forestry of the MAWF, Namibia Water Corporation (NAMWATER); UNAM, NUST, MME	Counterpart institutions for integrating isotope hydrology into national water resources management programmes
Marine and coastal environment	MFMR	Counterpart institution for assessing levels of contaminants in coastal waters, sediments and biota
Human resources capacity building	UNAM, NUST, AERPA	Institutions where education programmes and/or equipment related to nuclear science and technology are being hosted

## ANNEX 3: LEGAL FRAMEWORK AND IAEA-RELEVANT TREATIES

### MULTILATERAL AGREEMENTS

	Title	In Force	Status
<b>P&amp;I</b>	Agreement on the Privileges and Immunities of the IAEA		Non-Party
<b>VC</b>	Vienna Convention on Civil Liability for Nuclear Damage		Non-Party
<b>VC/OP</b>	Optional Protocol Concerning the Compulsory Settlement of Disputes		Non-Party
<b>CPPNM</b>	Convention on the Physical Protection of Nuclear Material	2002-11-01	accession: 2002-10-02
<b>CPPNM/A</b>	Amendment to the Convention on the Physical Protection of Nuclear Material	2017-08-16	ratification: 2017-08-16
<b>NOT</b>	Convention on Early Notification of a Nuclear Accident		Non-Party
<b>ASSIST</b>	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency		Non-Party
<b>JP</b>	Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention		Non-Party
<b>NS</b>	Convention on Nuclear Safety		Non-Party
<b>RADW</b>	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management		Non-Party
<b>PVC</b>	Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage		Non-Party
<b>SUPP</b>	Convention on Supplementary Compensation for Nuclear Damage		Non-Party
<b>RSA</b>	Revised Supplementary Agreements Concerning the Provision of Technical Assistance by the IAEA (RSA)	1991-10-30	



	<b>Title</b>	<b>In Force</b>	<b>Status</b>
<b>AFRA</b>	African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA) - Fifth Extension		Acceptance: 2016-04-01

#### **SAFEGUARDS AGREEMENTS**

<b>Reg.No</b>	<b>Title</b>	<b>In Force</b>	<b>Status</b>
1699	Agreement between the Republic of Namibia and the IAEA for the Application of Safeguards in connection with the NPT	1998-04-15	Signature: 1998-03-19
1899	Protocol Additional to the Agreement between the Republic of Namibia and the IAEA for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons	2012-02-20	Signature: 2000-03-22





## ANNEX 4: DETAILS OF PAST AND ONGOING TC PROGRAMME RELEVANT TO THIS CPF

Namibia joined the IAEA TC programme in 1991 and since then participated in 35 national, 76 regional and 8 interregional technical cooperation projects that have been completed. Namibia is also an active participant in the programme of the African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA).

Key areas and major impact include:

- Animal health and production: Control of animal diseases such as contagious bovine pleuropneumonia, brucellosis, and foot and mouth disease;
- Development of improved crop varieties of cowpea and sorghum;
- Strengthened radiotherapy and nuclear medicine services in Windhoek;
- Establishment of a nuclear medicine facility in Oshakati.

The following table summarises the past national TC programme over the previous three cycles (2012 – 2013, 2014 – 2015 and 2016 – 2017). Namibia also participated in several regional (AFRA and non-AFRA) projects which complemented the assistance provided below.

Thematic area	Project	Major impact and achievements	Key counterpart institutions and partners
Radiation Safety	NAM9005 Strengthening the Regulatory Capacity and Analytical Capabilities of the Regulatory Authority	A competent inspectorate for inspection and enforcement of regulatory requirements (TSA1) was established with clear roles and responsibilities. A national document was developed which profiles the required competency levels for all staff of the regulatory authority. This document includes four levels of competencies required for the Authority to effectively discharge its statutory responsibilities. A Personal Development plan was developed to assess the competency of each staff member and to propose and implement a skills development plan that addresses deficiencies in respect of the expected tasks to be executed. For inspection of industrial sources, guidelines for the NRPA were drafted. Inspection of medical facilities was strengthened. A needs analysis for a radioactive waste management facility (TSA4) was completed. Laboratory and human capacity to analyze radionuclides	NRPA, MHSS

Thematic area	Project	Major impact and achievements	Key counterpart institutions and partners
Food and Agriculture: Crop production and improvement, soil and water management	NAM5012 Developing High Yielding and Drought Tolerant Crops through Mutation Breeding	<p>in water (TSA4) was established and procured monitoring equipment is now being utilized.</p> <p>Radiation regulatory infrastructure was improved, and clear guidance on the establishment of a radioactive waste management facility and national capability for analysis of radionuclide in water including marine samples were established. The Ministry of Health and Social Services, as the administrator of safe and secure utilization of nuclear technology, operationalized its programme in line with international standards and recommendations.</p> <p>Capacity to use mutation breeding has been successfully enhanced resulting in the development of several advanced mutant lines with desirable traits (improved productivity and better adaptation to abiotic stress)</p> <p>An experimental design to evaluate soil fertility and plant nutrition was established: 1) Using N-15 stable isotope for nitrogen use efficiency and quantifying biological nitrogen fixation; 2) Using probes for measuring soil water and calculating water use efficiency.</p> <p>Early maturing (a drought avoidance trait), drought tolerant and better yielding mutant cowpea lines were developed and introduced to farmers during the 2015/16 season.</p> <p>Capacity to use mutation breeding has been successfully enhanced resulting in the development of several</p>	MAWF, Mannheim Research Station, UNAM, NUST



Thematic area	Project	Major impact and achievements	Key counterpart institutions and partners
	NAM5014 Evaluating Efficient Water and Nutrient Use, Molecular Characterization and Nutritional Composition of Mutant Germplasm Populations	<p>advanced mutant lines with desirable traits (improved productivity and better adaptation to abiotic stress)</p> <p>Production systems that incorporate improved pearl millet, sorghum and cowpea varieties and soil and water management practices were made available for small-scale farmers.</p> <p>The project team arranged a Farmers Information and Field Day in April 2017. Selection of the suitable mutants was done by farmers, guided by the team. This resulted in the MAWF releasing new varieties of cowpea (7) and sorghum (4) in December 2017. These varieties were multiplied to make the seeds available to all farmers. The soil and water plots for experiments were set up at the Mannheim Research Station. A genetically diverse mutant germplasm was generated for the future breeding programme, and mutant lines suitable for Namibian conditions were identified.</p>	
Food and Agriculture: Food Safety	NAM5013 Assessing the Spatial Distribution of Lead, Cadmium and Selected Pesticide Residues in Livestock Farming	<p>The understanding of the spatial distribution of lead, cadmium and certain pesticides in the livestock farming regions of Namibia has been improved. Relevant work on analyzing the status of heavy metals in marine products continues under NAM5015 project.</p> <p>The capacity of the CVL was strengthened particularly in the area of food safety relevant to the spatial distribution of lead, cadmium and selected pesticide residues in livestock. Specific outputs were:</p> <ul style="list-style-type: none"> <li>• Spatial distribution map and reports for lead and cadmium have been produced.</li> </ul>	MAWF, CVL



Thematic area	Project	Major impact and achievements	Key counterpart institutions and partners
		<ul style="list-style-type: none"> <li>Equipment and reagents required for the analysis of heavy metals and pesticides acquired and installed at the CVL.</li> <li>CVL analytical personnel had their skills enhanced in the area of heavy metal and pesticides analysis in kidney and liver samples</li> </ul>	
<b>Human Health: Radiotherapy and nuclear medicine</b>	NAM6009 Strengthening the Institutional Framework in Support of the National Cancer Control Programme; and  NAM6012 Strengthening Diagnostic and Treatment Capabilities at Oshakati and Windhoek Central Hospitals	<p>The projects contributed towards improving availability of trained professional staff at the Dr. A. Bernard May Cancer Care Centre, Windhoek Central Hospital. Windhoek is being provided with an Orthovoltage unit for treatment of skin cancers.</p> <p>New capacities include:</p> <ul style="list-style-type: none"> <li>Qualified staff through long-term training of a radiation oncologist through government cost-sharing with the Agency;</li> <li>Quality Assurance SOPs established and monitored;</li> <li>Trained personnel (medical physics, radiotherapist, radiographers, nurses) available to provide quality treatment;</li> <li>Plans to expand services in Windhoek and in the north of the country (Oshakati area) prepared through collaboration on drafting a Bankable document.</li> </ul>	MHSS, Windhoek Central Hospital, Oshakati State Hospital
<b>Human resources capacity building</b>	NAM0005 Establishing a Nuclear Science and Technology Training Programme; and  NAM0006 Establishing a Nuclear Science and Technology Research Centre	<p>The projects resulted in the enhanced capability to teach nuclear science and technology at post-graduate and undergraduate levels in order to promote research and analytical techniques in support of the initiatives of education institutions, government and industry.</p> <p>Outputs include:</p>	UNAM, NUST, AERPA