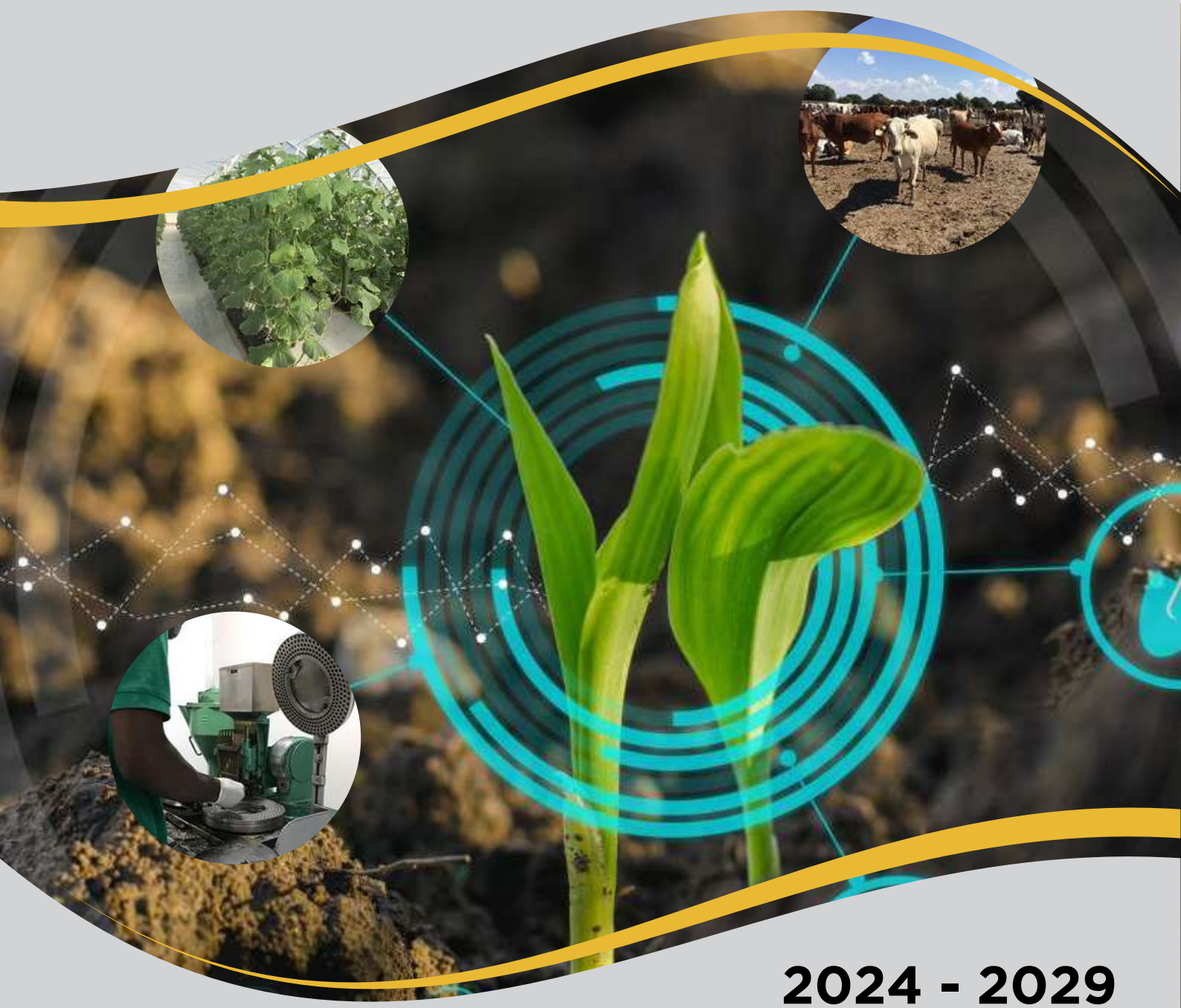
MINISTRY OF HIGHER EDUCATION, TECHNOLOGY AND INNOVATION

NCRST
NATIONAL COMMISSION ON RESEARCH, SCIENCE & TECHNOLOGY

THE NAMIBIA SUSTAINABLE BIOECONOMY STRATEGY



2024 - 2029

Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS

“With the technical and financial support of the Food and Agriculture Organization of the United Nations”.

ACKNOWLEDGEMENTS

The National Bioeconomy Strategy was developed through a multi-sectoral approach. Sincere appreciation goes to the NCRST team for the overall facilitation. Appreciation goes to the Bioeconomy Multi-sectoral Working Group (BMWG) members listed in Appendix 5 for their technical contributions and direction in crafting this document. Additional gratitude goes to the regional stakeholders who participated in the Stocktaking and Analysis Survey. Special acknowledgment is extended to FAO for providing technical and financial support in finalising this strategy.

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Foreword

Minister of Higher Education, Technology, and Innovation

Namibia has rich biodiversity; the varieties of indigenous and endemic plants and animal species have the potential to be sustainably utilised in the production of knowledge that can be transformed through science, technology, and innovation into value-added products, as well as processes and services. Bioeconomy is the "production, utilisation, conservation, and regeneration of biological resources, including related knowledge, science, technology, and innovation, to provide sustainable solutions (information, products, processes and services) within and across all economic sectors, and enable a transformation to a sustainable economy".

Thus, the Government of the Republic of Namibia with the assistance of the Food and Agriculture Organisation of the United Nations (FAO) developed a National Bioeconomy Strategy that is aimed at providing a roadmap of how to utilise the finite living resources sustainably to produce products with economic potential, and to create meaningful employment that leads to alleviation of hunger and improved food security. In this strategy, it is envisioned that Namibia will harness the full potential of biological resources through biological innovations.

The Bioeconomy Strategy 's implementation plan focuses on national priorities as defined in Vision 2030 (V2030), the National Development Plans (NDPs), and other national instruments that address economic empowerment and poverty eradication in line with the Sustainable Development goals (SDGs). The Harambee Prosperity Plans (HPPs), NDP5s, particularly NDP5, calls for *"increase benefits to communities through the establishment of a research and development centre for indigenous plant products and the growth of Bioeconomy based on sustainable commercialisation and value addition".* HPP II advocates for the development and implementation of both the Green and Blue Economy. The National Bio-economy Strategy will ensure a framework of programmes and initiatives addressing multifaceted challenges identified as critical by taking advantage of spill- over benefits from other sectors, such as agriculture, environment, manufacturing, and health.

Namibia's agricultural sector and the potential use of biomass to produce food and feed, materials or energy, make the strategy crucial for socio-economic advancement. Moreover, a sustainable and circular Bioeconomy, promoting long-awaited and much-needed bio-innovations is key to the recovery from the COVID-19 pandemic. This includes biological innovations that can assist in the treatment of diseases in future epidemics and other climatic and economic risks, for instance to strengthen the market for bio-based input alternatives. Positive impacts including spin-offs will only be realised if sector players are involved in implementing this strategy.

On behalf of the Government of Namibia, I would like to encourage all stakeholders to join hands towards effectively implementing the National Bioeconomy Strategy. I look forward to witnessing the tremendous contribution of the Bioeconomy sector to our national development agenda.

Dr. Itah Kandjii-Murangi

Hon. Itah Kandjii-Murangi (MP)
Minister of Higher Education, Technology, and Innovation

Statement by the Executive Director

Ministry of Higher Education, Technology and Innovation

Bioeconomy strategy development is reaching momentum globally. It is exciting to see Namibia being among the few countries in Africa and beyond the continent having developed their national sustainable Bioeconomy strategies. In addition, Namibia is one of the beneficiaries of the Food and Agriculture Organisation of the United Nations (FAO) Global project, "Towards Sustainable Bioeconomy Guidelines" (GCP/GLO/724/GER). The project's objective is to support member countries to develop coherent Sustainable Bioeconomy Programmes, including strategy development and implementation, towards a more sustainable agrifood system.

The National Commission on Research, Science, and Technology (NCRST) as an agency of the Ministry of Higher Education, Technology and Innovation (MHETI) facilitated the development of a National Bioeconomy Strategy. An interagency Bioeconomy Multisectoral Working Group (BMWG) consisting of public institutions, the private sector, non-governmental organisations, and higher education institutions was established to provide technical support during the formulation and development of Namibia's National Bioeconomy Strategy. The overall development process included a stocktaking and analysis exercise to establish the baseline of the Bioeconomy landscape in Namibia.

The key focus areas identified include health, agriculture, natural resources management and cross cutting issues related to Bioeconomy, while the strategic objectives focus on value-addition, Research Development and Innovation (RDI), and overall awareness creation. Therefore, this strategy envisages a paradigm shift that is required to for accelerated sustainable development. The Government would like to acknowledge with appreciation the generous assistance it has received from the FAO, the BMWG, and all stakeholders towards developing the national sustainable Bioeconomy strategy.

Dr. Alfred van Kent

Dr Alfred van Kent
Executive Director
Ministry of Higher Education, Technology and Innovation

Statement by the Chief Executive Officer

National Commission on Research, Science and Technology

Namibia`s Bioeconomy Strategy embraces the country 's commitment to driving innovation, sustainability, and economic growth within the bioeconomy sector. By leveraging bioeconomy sectors, Namibia has an opportunity to develop cutting-edge solutions that address national challenges while fostering a more sustainable and resilient future for all Namibians.

The consultative process that culminated in the Namibia Bioeconomy Strategy began in 2021 with the constitution of an interagency committee known as the Bioeconomy Multisectoral Working Group (BMWG). The representatives of these institutions provided the technical team with a comprehensive list of policies and legislation that falls within the Bioeconomy sectors. Using information from the benchmarking review of Bioeconomy strategies around the world, BMWG has identified strategic focus areas namely agriculture, health, natural resource management, and cross-cutting issues as key strategic focus areas of national interest.

During regional consultations with different stakeholders, challenges and opportunities related to the Bioeconomy in the different strategic focus areas were collated in the Bioeconomy Stocktaking and Analysis Report which was completed in 2021. I am convinced that the stocktaking and analysis report generated from engagements with different stakeholders nationwide, truly represents what Namibians want to see and has been well represented as initiatives under the National Sustainable Bioeconomy Strategy 2024 -2029. We envision that by the end of 2029, Namibia will have implemented an impactful, sustainable Bioeconomy strategy that fosters economic advancement and social progression.

The NCRST will play the overall coordination of the implementation to ensure that the objectives of the Bioeconomy Strategy are met. The BMWG will continue reporting periodically on various Bioeconomy programs and initiatives being implemented by agencies, ministries, as well as the private sector.

On behalf of the NCRST, I would like to express my gratitude to the FAO for both financial and technical assistance toward realizing the development of the national bioeconomy strategy. The NCRST is equally grateful to its staff members as well as to everyone who enormously contributed to setting the national bioeconomy direction for the next five years toward the socio-economic advancement of Namibia.

Prof. Dr. Anicia Peters

Prof. Dr. Anicia Peters
Chief Executive Officer
National Commission on Research, Science and Technology

ACRONYMS/ABBREVIATIONS

ABS	Access and Benefit-sharing
AfCFTA	African Continental Free Trade Area
Agribank	Agricultural Bank of Namibia
AGRIBUSDEV	Agricultural Business Development Agency
AMTA	Agro-Marketing and Trade Agency
BCC	Benguela Current Commission
BMWG	Bioeconomy Multisectoral Working Group
BoN	Bank of Namibia
CBD	Convention on Biological Diversity
CBOs	Community-based Organisations
CAADP	Comprehensive Africa Agriculture Development Programme
CBNRM	Community-based Natural Resource Management
COVID-19	2019 novel coronavirus disease
DBN	Development Bank of Namibia
EIF	Environmental Investment Fund
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FNB	First National Bank
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
HPPII	Harambee Prosperity Plan II
IAEA	International Atomic Energy Agency
ICCAT	International Commission for the Conservation of Atlantic Tunas
IRDNC	Integrated Rural Development for Nature Conservation
JICA	Japan International Cooperation Agency
MAWLR	Ministry of Agriculture, Water and Land Reform
MEATCO	Meat Corporation of Namibia
MEFT	Ministry of Environment, Forestry and Tourism
MHETI	Ministry of Higher Education, Technology, and Innovation
MLIREC	Ministry of Labour, Industrial Relations, and Employment Creation
MoHSS	Ministry of Health and Social Services
MIT	Ministry of Industrialisation and Trade

NAB	Namibia Agronomic Board
NACSO	Namibia Association of Community-based Natural Resource Management Support Organisations
NANCI	Namibian Network of the Cosmetics Industry
NBSAP II	National Biodiversity Strategic Action Plan II
NCRST	National Commission of Research, Science and Technology
NDP5	National Development Plan 5
NDT	Namibia Development Trust
NEI	Namibia Energy Institute
NANSO	Namibia National Students Organisation
NIP	Namibia Institute of Pathology
NIPDB	Namibia Investment Promotion and Development Board
NNF	Namibia Nature Foundation
NSFAF	Namibia Students Financial Assistance Fund
NSI	Namibia Standards Institution
NUST	Namibia University of Science and Technology
NTA	Namibia Training Authority
R&D	Research and Development
RDI	Research, Development, and Innovation
RLED	Regional Local Economic Development White Paper Policy
SADC	Southern African Development Community
SACU	Southern African Customs Union
SFA	Strategic Focus Area
SME	Small to Medium Enterprises
SO	Strategic Objective
UN	United Nations
UNAM	University of Namibia
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation

DEFINITIONS

BIO-BASED PRODUCTS refers to products that are wholly or partly derived from biomass and other biological resources, which are not used for food, feed, and fuel e.g., pulp and paper, timber for construction, cosmetics, and fibres for clothing.

BIODIVERSITY ECONOMY is the entirety of economic activities that either depend directly on the sustainable use of biodiversity, or contribute to biodiversity conservation and ecosystem services through their activities.

BIOECONOMY is the production, utilisation, conservation, and regeneration of biological resources, including related knowledge, science, technology, and innovation, to provide sustainable solutions (information, products, processes and services) within and across all economic sectors, and enable a transformation to a sustainable economy.

BIOENERGY is used for all energy derived from biofuels, including renewable energy produced by living organisms for industrial or commercial use that is derived from biological sources (such as plant matter or animal waste).

BIOFUEL is the fuel produced from biomass either directly (e.g., wood) or indirectly through the fermentation of sugars (e.g., ethanol).

BIOLOGICAL DIVERSITY means the variability among living organisms from all sources including, among other things, terrestrial, marine, and different aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species, and of ecosystems.

BIOLOGICAL RESOURCES (BIORESOURCES) are materials of biological origin, excluding organic material that has been embedded in geological formations and fossilised (e.g., fossil fuels, such as coal, petroleum, and natural gas).

BIOMASS is based on plant or animal life e.g., crops and trees, food, feed, and fibre crop residues; aquatic plants and animals, algae, fish bones, and other fish residues; forestry and wood residues; agricultural waste, including animal manure; processing by-products and any other non-fossil organic material.

BIOPRODUCT is all products made from biological resources, including food, feed, biofuels, and bio-based products.

BIOTRADE is when a product or service sourced from biodiversity is commercialised and traded in a way that respects people and nature.

FOOD LOSS is the decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retailers, food service providers, and consumers.

FOOD SECURITY AND NUTRITION Food security exists when all people consistently have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

FOOD SYSTEMS encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, marketing, trade, consumption, and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded.

FOOD WASTE refers to the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers, and consumers.

INDIGENOUS is naturally existing in a place or country rather than arriving from another place.

INDIGENOUS FOOD refers to plant- and animal-based foods that naturally exist and are produced in specific locations and consumed as part of traditional diets.

SUSTAINABLE FOOD SYSTEM is a food system that delivers food security and nutrition for all so that the economic, social, and environmental bases to generate food security and nutrition for future generations are not compromised.

EXECUTIVE SUMMARY

The National Bioeconomy Strategy, 2024 to 2029 sets the scene for employing programmes and initiatives that will help Namibia to take advantage of the benefits of the Bioeconomy. Successful implementation of this strategy will ensure improved quality of life of communities and economic growth through research and development of cutting-edge research, development, and innovation (RDI) that resolves socio-economic issues in Namibia. Bioeconomy cuts across the sectors that speak to health, food security, and nutrition issues, and directly impacts productivity, especially in the manufacturing industry. It is anticipated that this strategy will promote Bio-economy activities to address critical gaps in the economy.

To kick off the drafting of the National Bioeconomy Strategy, an inter-agency committee called the Bioeconomy Multisectoral Working Group (BMWG) was set up to assist with technical inputs and direction of the strategy. The BMWG consists of 24 entities (nine government ministries, five private companies, ten non-governmental organisations, public enterprises, and higher education institutions). The National Commission on Research, Science, and Technology (NCRST) in collaboration with the Ministry of Higher Education, Technology and Innovation will coordinate the implementation of this strategy.

The goal of the Bioeconomy strategy is to ensure the integration of Bioeconomy activities into the overall national economic landscape. It is envisioned that this strategy will drive the establishment of a vibrant Bioeconomy that drives innovation, conservation, and sustainable utilisation of biological resources. The mission of the strategy entails the promotion and acceleration of the deployment of innovations as well as the unceasing use of biological resources for growth and sustainable development in Namibia. To take advantage of the opportunities offered by the Bioeconomy, Namibia will, for the next five years leading up to 2029, focus on the following areas: Agriculture; Health and Natural Resource Management.

1. INTRODUCTION

1.1. Background

Article 95(l) of the Namibian Constitution proclaims that "to promote the welfare of the Namibian people", the state shall adopt policies that ensure: *"...maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future..." (Namibian Constitution, Art. 95).*

Within Namibia's policy for long-term development, Vision 2030, the Government aspires to achieve development through the three pillars of sustainability, namely, economic, social, and environmental development.[1] These pillars are based on Namibia's commitment to the 1992 Rio Declaration on Environment and Development . Three multilateral treaties emanated from the Rio Declaration; the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and the United Nations Convention to Combat Desertification (UNCCD).

Namibia is a party to all three Conventions; it has ratified the supplementary protocols of the CBD, which include the Cartagena Protocol on Biosafety to the Convention on Biological Diversity and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation to the Convention on Biological Diversity (Nagoya Protocol on Access and Benefit Sharing, ABS). Additionally, Namibia became a party to the Paris Agreement in 2016, an agreement within the UNFCCC on climate change mitigation, adaptation, and finance.[4]

Apart from the linkages to Namibia's long-term goals, these protocols are reflected in the National Development Plan 5 (NDP5) 2017/18 to 2021/22. In addition, the CBD and its supplementary protocols are locally implemented through the National Biodiversity Action Plan II (NBSAP II). The plans aim to enforce national policies that protect biodiversity whilst using biological resources sustainably in different sectors such as agriculture, environment, tourism, fisheries, and mining.[3]

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[1] Namibia Vision 2030: Policy for long term National Development
[2] Rio Declaration (Agenda 21)
[3] Environmental Management Act, 2007 (Act No. 7 of 2007)
[4] Namibia's Second National Biodiversity Strategy and Action Plan 2013 to 2022 (NBSAP II)
[5] Paris Agreement 2015

Namibia's biodiversity policies promote the sustainable use of biological resources for food, medicine, biofuel, construction, and as a source of income.[3] The NBSAP II has focused mainly on protection goals and sustainable use of raw materials without optimally exploring the potential of value addition to produce innovative sustainable products.

Bioeconomy activities are reflected in biodiversity policy frameworks, although not entirely focused on research, development, and innovation (RDI). Bioeconomy has been identified as a key tool to address approximately nine (9) of the seventeen (17) sustainable development goals (SDGs).

Therefore, a National Bioeconomy Strategy provides Namibia with an opportunity to tackle current challenges in using biological resources for sustainable development. In addition, this strategy addresses gaps in existing policy frameworks in the context of Bioeconomy-related activities. It provides initiatives and actions that will help Namibia address poverty and unemployment and promote rural development.

1.1.1 STRATEGIC FOCUS AREAS (SFA) AND INITIATIVES

1.1.1.1 Strategic Focus Areas

Namibia is an upper-middle-income country with a population of 3.0 million people as per the Namibia Statistics Agency 2023 preliminary report,[7b] with an average per capita income of around US$4 763.46.[7a] The most densely populated areas are the central north, and northeast, where over 50 percent of the population lives. The country generates approximately N$13 billion in revenue from its biodiversity, of which 40 percent is due to tourism.

Overall, in 2020, primary industries accounted for 19.1 percent of the Gross Domestic Product (GDP) of which the agriculture, forestry, and fishing sector account for 9 percent, livestock farming accounted for 3.5 percent, crop farming and forestry 2.9 percent, Fishing and fish processing on-board 2.6 percent and the mining and quarrying sector accounted for 10.1 percent.[8]

The secondary industries accounted for 16.5 percent of the GDP of which manufacturing accounted for 11 percent (0.6 percent is meat processing, 1.4 percent grain and mill products, 2.9 percent other food products, 1.4 percent beverages,

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6 United Nations World Population Prospectus. 2019. Namibia.
7[a] Namibia Statistics Agency, 2020. Preliminary National Accounts
7[b] Namibia Statistics Agency, 2023. Preliminary National Accounts
8 Biodiversity Resource Mobilisation Strategy, MEFT, 2019

0.3 percent textile and wearing apparel, 0.2 percent leather and related products, 0.3 percent wood and wood products, 0.2 percent publishing and printing, 0.6 percent chemical and related products, 0.2 percent rubber and plastic products, 0.3 percent non-metallic minerals products, 0.7 percent basic non-ferrous metals, 0.3 percent fabricated metals, 1.2 percent diamond processing, and 0.3 percent other manufacturing), electricity and water and construction accounted 1.8 percent each[9].

Tertiary industries accounted for 57.9 percent of the Gross Domestic Product, of which 9.6 percent is wholesale and retail trade, and repairs, 1.4 percent hotels, and restaurants, 1.8 percent transport, 0.7 percent storage, 0.7 percent professional, scientific and technical services, 10.9 percent education, 3.7 percent health.[10]

Bioeconomy has the potential to contribute to the above sectors and to increase their respective share of the GDP. To do this, Namibia will focus on the selected strategic focus areas.

The stakeholders identified several challenges and opportunities related to the Bioeconomy in the different strategic focus areas and captured in the Stocktaking and Analysis Report of the Namibian Bioeconomy.

The strategic focus areas for achieving a sustainable Bioeconomy and their main opportunities and challenges are as follows:

- **SFA 1** ***Agriculture:*** The Namibian agricultural sector contributes up to five (5) percent of Namibia's GDP and has the largest workforce with almost 170 000 employees recorded at February 2020. Approximately 48 percent of Namibia's rural households depend on subsistence agriculture. Constraints in this strategic focus area that can be mitigated by introducing innovative bioproducts include low production output in both crop and livestock production, through innovative tools to produce resilient crop varieties and livestock breeds. Other mitigation measures can be using RDI to prevent post-harvest losses (food loss) due to climate change shocks, including drought, and value-addition through infrastructure development and innovative by-products.
- **SFA 2** ***Health:*** Health challenges, including the COVID-19 pandemic, call for innovative diagnostic tools, vaccines, and therapeutics. Local communities have not been able to harness the full benefits of indigenous plants and corresponding knowledge.

[10] https://ippr.org.na/wp-content/uploads/2020/02/Agriculture-in-Namibia-An-Overview.docx-10.pdf

Through access and benefit-sharing (ABS) procedures, mechanisms can be designed to promote bio trade in indigenous medicinal plants that can be mainstreamed in primary healthcare systems.

- **SFA 3** ***Natural Resources Management:*** Under the pillar of environmental sustainability, the NDP5 has two focus areas, namely conservation and sustainable use of natural resources and Environmental Management and climate change. The safeguarding of ecosystems and biological diversity, and strengthening environmental protection, may require trade-offs between ecological sustainability and economic progression in designing the Bioeconomy legal framework.

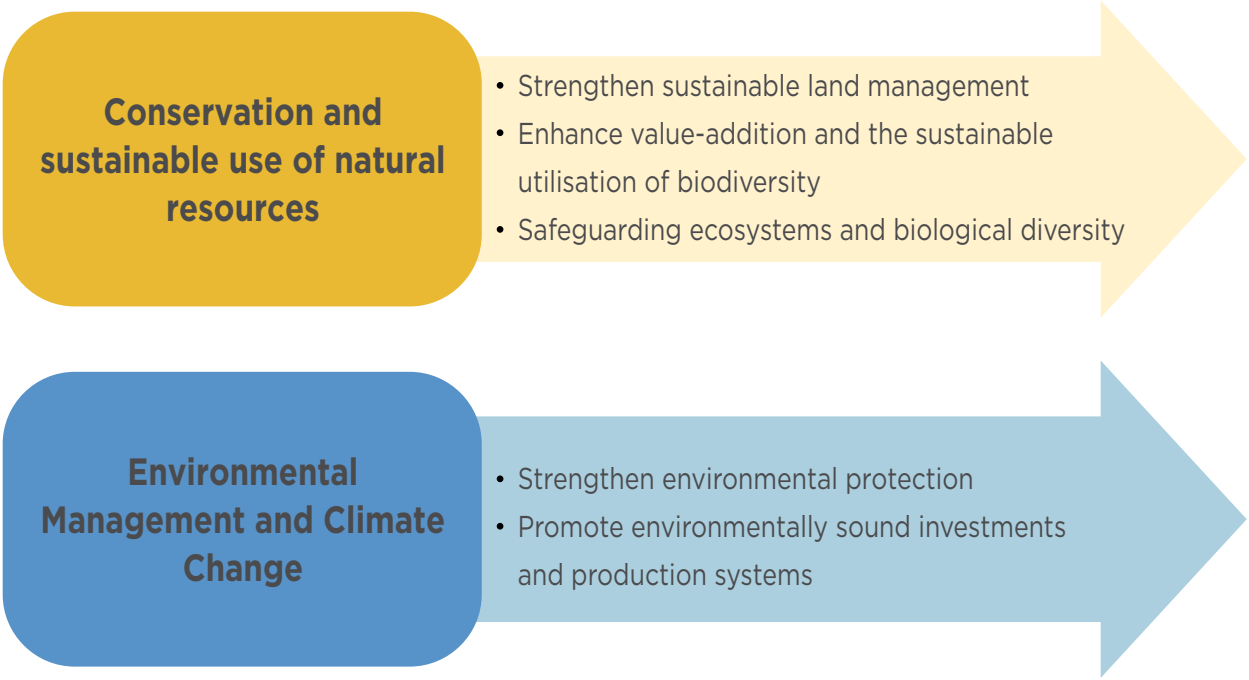

Figure 1: NDP5 Pillar on environmental sustainability

- **SFA 4** ***Cross-cutting Issues Related to the Bioeconomy:*** This focus area covers infrastructure, value-addition, standards, capacity-building, and policies that fall within the scope of Bio-economy activities. Constraints in implementing a sustainable Bioeconomy under this focus area include lack of RDI and capacity for rural communities to create value chains of potential products and by-products emanating from biological resources, including waste. Rural communities lack the skills to allow them to process raw materials into semi-finished or finished goods.

In addition, the lack of funding schemes from banks and other funding institutions restricts communities from the full benefits of these bio-resources.

The Growth at Home Strategy, with emphasis on industrialisation, manufacturing and value-addition, will catalyse the implementation of different mechanisms to ensure economic growth. The strategy covers three (3) areas namely:

- supporting value-addition, upgrading, and diversification for sustained growth through science and innovation,
- securing market access at home and abroad, and
- improving the investment climate and conditions.

The Growth at Home Strategy will complement the National Bio-economy Strategy by highlighting the need to use bio-resources to create novel value chains that uplift rural and urban communities. The areas of indigenous knowledge and industrial and manufacturing activities will be intertwined in the four (4) strategic focus areas. The SFAs will be implemented through corresponding strategic initiatives designed to build a sustainable Bioeconomy.

1.2. Consultation Process

Transforming Namibia into a knowledge-based economy through RDI is part of the Ministry of Higher Education, Technology, and Innovation's (MHETI) mandate. The Ministry has several public entities that implement its mandate. These include the National Commission on Research, Science and Technology (NCRST), the Namibia Training Authority (NTA), Namibia University of Science and Technology (NUST), and the University of Namibia (UNAM), amongst others. Therefore, although the Bioeconomy consists of numerous stakeholders in diverse sectors, the function of coordinating the implementation of the National Bio-economy Strategy will rest with the NCRST.

The consultative process that culminated in the draft Namibia Bio-economy Strategy began in January 2021 with the constitution of an interagency committee known as the Bioeconomy Multisectoral Working Group (BMWG). The BMWG consisted of 24 entities (nine government ministries, five private companies, ten non-governmental organisations, public enterprises, and higher education institutions). The representatives of these institutions provided the technical team with a comprehensive list of policies and legislation within their scope of work that falls in the Bioeconomy.

At the initial BMWG meetings in January and February 2021, the working group set six (6) strategic focus areas namely agriculture, health, indigenous knowledge, natural resource management, industrial and manufacturing issues, and cross-cutting issues, and using information from a benchmarking review document of Bioeconomy strategies around the world that the NCRST conducted in 2016.

Following the meetings of the BMWG, a survey was compiled to solicit inputs from wider stakeholder groups and partner organisations. The survey results were compiled into a stocktaking and analysis report that informs this strategy. Two-hundred and sixty-five (265) stakeholders were engaged through face-to-face workshops and online meetings through the nationwide survey. Based on results from the survey, the BMWG then narrowed the strategic focus areas to four (4), namely agriculture, health, natural resource management, and cross-cutting issues related to the Bioeconomy.

Once the technical work was completed, eight (8) regional consultation workshops were held representing all 14 regions of Namibia. The stakeholders identified the challenges and opportunities related to the Bioeconomy in the different strategic focus areas and captured in the Stocktaking and Analysis Report of the Namibian Bioeconomy. The selected strategic focus areas and corresponding objectives are highlighted in the following section.

1.3. Bioeconomy in the Namibian Context

In NDP5, the Namibian economy is projected to move from an input-dependent economy into a knowledge-based economy. The plan directs investments in research, development, innovation, skills development, diversification of economic activities, and greater value addition. The pillar of Economic Progression and corresponding sub-pillars of Economic Growth and Economic Infrastructure recognise the need to develop the agricultural sector and ensure food security.

The strategies envisioned in the plan, amongst others, emphasise the need for value addition to local products and import substitution for agro-processed goods additionally, given that the agricultural sector supports 70 percent of Namibia's population. The plan also focuses on strategies that contribute to research and innovation by highlighting the need for an enabling environment for science, technology, and innovation. The NDP5 further highlights the need to build national research and innovation infrastructure and forge strategic partnerships to foster entrepreneurship.

Health and nutrition are also critical enablers of Namibia's social transformation. Therefore, key areas related to Bioeconomy emerge from the national development plans, such as the need to maximise the use of technologies related to agriculture, health, and manufacturing or industry in a sustainable manner.

Namibia will only be able to realise the above if she optimises the use of emerging technologies in these sectors. To reduce losses to agrifood systems and detrimental impacts to ecosystems caused by diseases of plants and animals, and aquatic pests, including waterborne infections, zoonotic diseases, and pandemics like COVID-19, the national Bioeconomy strategy will employ the "One Health" approach. In a changing climate and environment, the One Health approach will enhance productivity and reduce risks from biological and chemical threats, by applying integrated pest and biosecurity management approaches on a national, regional, and global scales for more sustainable, resilient, and inclusive agricultural systems.

Therefore, for the years leading up to 2029, Namibia will have the following focus areas concerning Bioeconomy:

- Agriculture
- Health
- Natural Resource Management
- Cross-cutting Issues Related to Bioeconomy

1.4 Rationale:

The Revised National Science, Technology and Innovation policy 2020-2030 identifies the need to develop and implement a National Bioeconomy Strategy 2024 to 2029 that will set the scene for employing programmes and initiatives that will help Namibia to take advantage of the benefits of the Bioeconomy.

1.5 Alignment:

The national Bioeconomy Strategy was developed in line with national policies and international frameworks listed under Appendix 4:

VISION

A vibrant bioeconomy that drives innovation, conservation, and sustainable utilisation of biological resources.

MISSION

To promote and accelerate the deployment of innovations and the sustainable use of biological resources for growth and sustainable development in Namibia.

STRATEGIC OBJECTIVES

Strategic Initiatives

The strategic initiatives designed by stakeholders speak directly to the challenges identified in the selected SFAs.

STRATEGIC OBJECTIVE 1 (SO1):

TO CREATE VALUE-ADDITION PLATFORMS FOR BIO-BASED PRODUCTS

STRATEGY 1

Promote and support the quality of bio-based indigenous products and services

- Promote initiatives that plough funds towards value-addition of local fresh produce, develop processing centres to serve and enable communal farmers participation in the overall bush biomass value chain. Educate farmers on the various hybrid varieties and techniques to improve output and lobby market leaders to retail local innovations, especially those derived from underutilised crops.

STRATEGY 2

Enhance products produced through bio-innovation from indigenous biological resources

- Invest in the research and development of pharmaceuticals derived from indigenous biological resources coupled with the drive to develop and improve infrastructure used in the production of indigenous based pharmaceuticals.

STRATEGY 3

Support the utilization of high-performing crop varieties and processing of local fresh produce

- Develop and adopt national guidelines (including international benchmarking) for the initial screening and subsequent production of bio-based medicinal products to ensure appropriate quality of end products for easier market penetration.

STRATEGY 4

Support the development of value chains based on non-timber forest and wildlife products

- Establish initiatives to drive the advancement of non-timber forest products and catalyse the development of more sustainable practices in natural resource management (especially in conservancies and communal initiatives).

STRATEGIC OBJECTIVE 2 (SO2):

TO CONTRIBUTE TOWARDS ENVIRONMENTAL SUSTAINABILITY

STRATEGY 1

Advance climate-smart agricultural practices that contribute to sustainable agrifood systems

- Increase the use of climate-smart practices by providing incentives to farmers that utilise techniques which enable barren land to become fit for agricultural purposes.

STRATEGY 2

Promote fossil-free technologies and ecosystem-based monitoring tools

- Procure and make available carbon capturing technologies, encourage the use of alternative energy sources such as solar. Develop and implement monitoring tools to protect the environment. Promote the production and use of green hydrogen locally as an energy source for the future.

STRATEGY 3

Foster the sustainable use of natural resources.

- Promote certification schemes and develop criteria for certification coupled with the introduction of subsidies to encourage sustainable use of natural resources.

STRATEGIC OBJECTIVE 3 (SO3):

TO IMPROVE BIO-BASED PRODUCTS AND SERVICES THROUGH RESEARCH, DEVELOPMENT AND INNOVATION (RDI).

STRATEGY 1

Strengthen research that promotes health and agricultural biosciences innovation

- Support innovation within the agricultural biosciences fraternity by funding calls and setting up infrastructure to facilitate the transition of economically viable abstracts that increase the yield of both crops and livestock.

STRATEGY 2

Strengthen research efforts to co-create products with rural communities

- Invest in programmes that foster collaborations to directly add value to research activities involving rural communities.

STRATEGY 3

Promote socio-economic-driven research focusing on value addition

- Conduct comprehensive training on ABS procedures and foster multi-sectoral collaborations to realise the potential of bioproducts within the Namibian market.

STRATEGIC OBJECTIVE 4 (SO4):

TO CREATE AWARENESS ON BIOECONOMY IN DIFFERENT SECTORS

STRATEGY 1

Valorise indigenous products and services

- Create a platform to market indigenous innovations and their widespread benefits

STRATEGY 2

Capacitate the nation on indigenous resources profiles

- Conduct nationwide education campaigns to inform the masses on indigenous resources of economic importance and how best communities can ensure they benefit from their natural abundance.

STRATEGY 3

Facilitate the integration of Bioeconomy in sectoral policy instruments

- Engage and sensitise policymakers on the importance of legislation that advocates for indigenous knowledge protection. Integrate the protection of indigenous knowledge into mainstream legislation.

3. IMPLEMENTATION OF THE NATIONAL BIOECONOMY STRATEGY

The national bio-economy strategy is framed by Vision 2030, and the National Development Plans (NDPs). NDP5 sets out to achieve industrialisation by integrating the four pillars of sustainable development: Economic Progression, Social Transformation, Environmental Sustainability, and Good Governance. Key role players in bioeconomy include governmental agencies, public and private companies, research institutions, community-based organisations (CBOs), non-governmental organisations, and the public. The different roles and potential contributions of stakeholders, and the strategic objectives and initiatives they will be implement are outlined in Appendix 4. The action plan for strategy implementation is detailed in Appendix 1.

4. COMMUNICATION STRATEGY:

The National Bio-economy Strategy 2024-2029 will be transmitted institutionally by the Bioeconomy Multi-sectoral working group. Additionally, public awareness of the strategy will be achieved using different media platforms, public engagements, seminars, workshops and other various outreach activities.

5. MONITORING AND EVALUATION FRAMEWORK AND REPORT

This section and Appendix 2 detail the monitoring and evaluation framework for the implementation of the bioeconomy strategy, including indicators at all levels of the implementation plan. To ensure that the initiatives of the bioeconomy strategy are met, continuous carrying out of data collection and analysis will be undertaken under the supervision of the BMWG and the overall coordination by NCRST, with periodic reporting to the NCRST and BMWG by the implementing agencies, ministries, as well as the public and the media.

5.1. Annual monitoring and evaluation (m&e):

The Monitoring and Evaluation System of the Bioeconomy strategy will generate evidence that will be used to make course corrections and adjustments to achieve the desired strategy objectives, targets and outcomes. The monitoring process implies continuous data collection of the different performance indicators of the Bioeconomy strategy and an aggregation compilation at the end of each semester (after six months). Hence, an annual report will be compiled at the end of every year to track the implementation of activities and performance indicators.

5.2. Mid-term Evaluation:

A mid-term evaluation of the Strategy will be conducted during the third year of its implementation to determine and establish the Strategy's progress (achievements and status) after two years of its execution, including experienced challenges. In addition, the mid-term evaluation will assist in formulating the mitigation measures for the remaining implementation period.

5.3. End-term and Impact Evaluation:

The final M&E is envisaged to be carried out in 2029, (at the end of the last year of the Strategy), to sum up the overall implementation results concerning the implementation plan and expected key indicators. The comprehensive M&E results and impact of the Bioeconomy Strategy shall be used as a lesson learned for updating and revising the next Bio-economy Strategy beyond 2029.

6. RESOURCE MOBILISATION APPROACH OF THE BIO-ECONOMY STRATEGY

The Government of the Republic of Namibia will be funding the implementation of the Bio-economy Strategy with support from multilateral and bilateral partners – existing and new partnership agreements with multilateral and bilateral partners to cover the gap in financing the implementation of the Bioeconomy. Grants can be notably provided through grant-writing in partnership with the UN agencies, the European Union (EU), USAID, DFID, and other bilateral partners.

The government will facilitate investments and access to bank loans by developing financial tools such as zero-collateral loans for farmers and entrepreneurs in the Bio-economy, in collaboration with the private sector, including Agribank and Development Bank of Namibia.

7. CONCLUSION

Bioeconomy includes all activities related to the production, use, and processing of bio-resources for the justifiable production of renewable resources from land, fisheries, and aquaculture environments, and their conversion into food, feed, and bio-based products as well as the related public services. These activities aim to provide a sustainable response to society's nutritional and material needs while preserving natural resources and ensuring the provision of quality environmental services.

Bioeconomy comprises primary production such as agriculture, forestry, fisheries, aquaculture, and industries that use or process biological resources. Therefore, Bioeconomy activities bring significant changes to our society, anticipated through the transformation of the economic systems

Namibia's Bio-economy Strategy therefore simultaneously sets out a framework for conservation of these resources for future generations. The current action plan (Appendix 1) outlines the concrete indicators for efficient implementation of the strategy in Namibia from 2024 to 2029. The plan deliberately focuses on the priority components of the Bioeconomy based on the scoping conducted by NCRST with the support of FAO. Overall, it has been echoed by the stakeholders that dissemination of the national Bioeconomy is a critical role for its successful implementation.

The Namibia Bioeconomy Strategy is consistent with other national development policies and plans.

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9. APPENDIXES

Appendix 1: IMPLEMENTATION ACTION PLAN

PERFORMANCE INDICATORS, RESPONSIBLE INSTITUTIONS, TARGETS, AND TIMEFRAME

OBJECTIVE 1(SO1): • TO CREATE VALUE-ADDITION PLATFORMS FOR BIO-BASED PRODUCTS

Strategy	Activity	Output	Key Indicators	Base line	Timelines & Targets per Year					Budget (NAD '000)					Name of Responsible Agencies/ Institutions	Name of Lead Agencies/ Institutions
					2024/ 25	2025/ 26	2026/ 27	2027/ 28	2028/ 29	2024/ 25	2025/ 26	2026/ 27	2027/ 28	2028/ 29		
Promote and support the quality of bio-based indige-nous products and services	1. Mobilise funding for value addition in agricultural produce with a focus on neglected and under-utilised crops, micro-organisms and plants	Seed funding available to process local products	Amount of funds mobilised	**0**	5 000 000	7 000 000	9 000 000	11 000 000	**13 000**	**800**	**800**	**800**	**800**	**800**		**NCRST, MAWLR**
	2. Develop joint project proposals with local authorities for funding of communal famers' biomass value chain activities	Bankable biomass commu-nal projects	Number of biomass projects in communal areas	**0**	3	5	7	12	**14**	**0**	**0**	**0**	**0**	**0**		**NCRST, MEFT**
	3. Facilitate the establishment of communal biomass associations.	Communal farmers' biomass associations	Number of communal farmers that are members of the communal biomass associations	**0**	15	20	25	27	**33**	**0**	**0**	**0**	**0**	**0**		**NCRST, MEFT, EIF, N-BiG**
	4. Train local communities (including youth and women) on how to produce, biomass derivatives e.g., charcoal, livestock feed	Knowledgeable farmers able to produce biomass derivatives	Number of biomass products produced by communities	**0**	3	7	9	13	**20**	**250**	**250**	**250**	**250**	**250**	Ministry of Environment Forestry & Tourism (MEFT), Ministry of Industrialisation, Trade and SME Development (MIT), Ministry of Health and Social Services (MoHSS), Ministry of Gender Equality, and Child Welfare (MGECW), Ministry of Mines and Energy (MME), National Commission of Research, Science, and Technology (NCRST), Ministry of Labour, Industrial Relations and	**NCRST, MEFT, EIF**
	5. Construct and equip existing infrastructure with modern technologies for the sustainable production of bioproducts (i.e., biobased chemicals, biofuels, bioenergy, bio-	Modern infrastructure used to produce bioproducts	Number new infra-structure constructed with modern technologies and utilised for the sustainable production of bio-products Number of existing	**0**	2	5	7	9	11	1 500	2 000	3 500	4 500	5 000		**MAWLR, AGRI-BANK, MoHSS**

	leaching, bio-pulping, and bio-catalysts)		infrastructures equipped with modern technologies.												Employment Creation (MLIREC), Namibia Standards Institution (NSI), Namibia Biomass Industry Group (N-BiG), Agra ProVision, AgriBank, Development Bank of Namibia, University of Namibia (UNAM), Namibia University of Science and Technology (NUST), International University of Management (IUM)	
	6. Establish agro-processing technology stations	Accessible agro-processing technologies	Number of SMEs supported at the established technology stations		5	15	25	35	40	3 000	3 000	3 000	3 000	3 000		**NCRST, MAWLR, AGRI-BANK**
	7. Develop online platforms that links local producers to the market	Accessible platforms	Number of users accessing platforms (number of platforms developed)		10	35	57	77	**100**	150	50	50	50	50		**NCRST, NAB, MAWLR**
	8. Produce pharmaceutical products through bio-innovation of indigenous biological resources (including micro-organisms plants, and animals)	Commercialised pharmaceutical products derived from indigenous biological resources	Number of commercialised pharmaceutical products derived/ produced from indigenous biological resources		4	6	8	10	15	800	200	200	200	500		**AMTA, MAWLR**
Enhance products produced through bio-innovation from indigenous biological resources	1. Produce pharmaceutical products through bio-innovation of indigenous biological resources (including micro-organisms plants, and animals)	Commercialised pharmaceutical products derived from indigenous biological resources, accessible infrastructure for medicinal production	Number of patented indigenous traditional knowledge / products		3	8	8	8	**8**	0	0	0	0	0	NIPDB, MYSN, UNAM, MoHSS, NUST, IUM, FabuPharm, NIP, Pathcare, Namibia Network of the Cosmetics Industry, NSI, NCRST	**MoHSS, UNAM, NUST, IUM**
	2. Develop and improve infrastructure used for medicinal production	Accessible infrastructure for medicinal production	Number of developed /improved medicinal production infrastructure	1	2	3	4	5	6	1 500	1 500	1 500	1 500	1 500		**MoHSS, UNAM, NUST, IUM**

Support the utilisation of high-performing crop varieties and process-sing of local fresh-produce	1. Development of national standards or adoption of international standards for the processing of indigenous medicinal plants, animals, and micro-organisms	Processed products produced in line with developed national standards	Number of processed products produced in line with developed of national standards developed	0	2	6	8	10	**15**	70	70	70	70	70		**NSI**
Support the development of value chains based on non-timber forest and wildlife pro-ducts	1. Develop online platforms that links non-timber forest and wildlife producers (i.e., for Marula, Mutete, Manketti, etc.) to the market	Accessible platforms	Number of users accessing the platforms	0	5	6	8	10	**10**	150	150	150	150	150	UNAM, NUST, FAU, MYSN, NIPDB, IUM, MEFT, MAWLR, NCRST, NCE, Namibia Association of CBNRM, NTA, EIF	**NCRST**

STRATEGIC OBJECTIVE 2(SO2): TO CONTRIBUTE TOWARDS ENVIRONMENTAL SUSTAINABILITY.

Strategy	Activity	Output	Key Indicators	Baseline	Timelines & Targets per Year					Budget (NAD '000)					Name of Responsible Agencies/ Institutions	Name of Lead Agencies/ Institutions
					2024/25	2025/26	2026/27	2027/28	2028/29	2024/25	2025/26	2026/27	2027/28	2028/29		
Advance climate-smart agricultural practices that contribute to sustainable agrifood systems	1. Restore agricultural land through sustainable bush thinning and biomass utilisation	Bush-encroached land converted to arable land	Number of hectares reclaimed from bush encroachment	10 000	10 000	10 000	10 000	10 000	10 000	**2 500**	**2 500**	**2 500**	**2 500**	**2 500**	MEFT, MAWLR, N-BiG, NCE	**MAWLR**
Promote fossil-free technologies and ecosystem-based monitoring tools.	1. Capture carbon emission in local industrial processes (e.g. in charcoal production)	Technologies that capture carbon emissions for local industries	Number of local industries using technologies that capture carbon emission	0	2	4	6	8	**10**	1 500	0	0	0	0	N-BiG, MEFT, NCE, MAWLR, EIF, NSI	**MEFT**
			%Carbon captured by technologies	25	25	25	25	25	**25**	**0**	**0**	**0**	**0**	**0**		
	2. Develop ecosystem-based monitoring tools to safeguard the environment	Monitoring tools for the ecosystem	Number of developed/ adopted ecosystem monitoring tools	0	2	4	6	8	**10**	500	0	0	0	0		**MEFT**
	3. Develop technologies Congruent to the usage of green hydrogen and its derivatives	Available /Accessible Green hydrogen technologies in local industries	Number of Green hydrogen technologies	0	2	5	7	8	**10**	2 500	2 500	2 500	2 500	2 500		**NCRST, HYPHEN, DAURES HYDROGEN VILLAGE**
Foster the sustain-able use of natural resources	1. Develop platforms to promote certification of local bio-products and services in eco-tourism	Conservancies, communities, organisations certified under sustainable usage of natural resources	Number of certified conservancies, communities, organisations	0	5	10	15	20	**25**	500	0	0	0	0		**MEFT**

STRATEGIC OBJECTIVE 3(SO3): ***TO IMPROVE BIO-BASED PRODUCTS AND SERVICES THROUGH RESEARCH, DEVELOPMENT AND INNOVATION (RDI).***

Strategy	Activity	Output	Key Indicators	Baseline	Timelines and Targets per Year					Budget (NAD '000)					Name of Responsible Agencies/ Institutions	Name of Lead Agencies/ Institutions
					2024/25	2025/26	2026/27	2027/28	2028/29	2024/25	2025/26	2026/27	2027/28	2028/29		
Strengthen research that promotes health and agricultural bioscience innovation	1. Conduct applied research aimed at improving plant and animal productivity	Improved plant and animal varieties	Number of plant varieties emanating from research	0	2	3	5	7	**8**	750	750	750	750	750	Ministry of Sport, Youth and National Service (MSYN), Ministry of Urban and Rural Development (MURD), Ministry of Agriculture, Water and Land Reform (MAWLR), EIF, Ministry of Environment, Forestry & Tourism (MEFT), Ministry of Industrialisation, Trade (MIT), Ministry of Health and Social Services (MoHSS), National Commission of Research, Science, and Technology (NCRST), Namibia Biomass Industry Group (N-BiG), Agribank, Development Bank, UNAM, NUST, EIF, NCE, AMTA, NAB MoHSS, NCRST, NUST, UNAM, NMRC, FabuPharm, NNCI, MEFT	**NCRST**
			Number of animal varieties emanating from research	0	1	2	3	4	**5**	750	750	750	750	750		
	2. Issue research calls to support agricultural and health biosciences innovation	Research chair in agricultural and health biosciences innovation	Number of Research chair in agricultural and health biosciences innovation emanating from biotechnology RDI	0	1	1	2	2	**2**	500	500	500	500	500		
	3. Mobilise funds for research and training in agriculture, health, and natural resource-related projects	Available funds for research and training	Amount of fund mobilised		2 500 000	2 500 000	3 000 000	4 000 000	4 500 000	500	500	500	500	500		
Strengthen research efforts to co-create products with rural communities	1. Establish partnerships between researchers and rural communities	Research collaboration on agreements between rural communities and researchers	Number of agreements between rural communities and researchers		5	10	15	20	**25**	0.00	0.00	0.00	0.00	0.00	MEFT, NUST, UNAM, MIT, MICT, N-BiG, MSYN, Local Authorities, NCRST BIPA	**NCRST**
Promote socio-economic-driven research focusing on value addition	2. Train youth and women groups in value addition focusing on bioproducts	Skilled youth and women groups	Number of trained youth and women groups	4	5	15	25	35	45	50	50	50	50	50	N-BiG, MEFT, NCE, MAWLR, EIF, MSYNS, NCRST, NSI, UNAM, NUST, MIT, MURD, AgriBank, DBN, NAB, AMTA, MIRC	**NCRST, MYSNS**
	3. Train SMEs in ABS	ABS contracts between Namibian SMEs and communities	Number of SMEs trained on ABS	0	15	20	45	45	**50**	200	200	200	200	200		**MEFT**
			Number of contracts between SMEs and communities.	0	5	7	13	15	**20**	0	0	0	0	0		
	4. Establish trade relations with regional and international governments on the trade of bioproducts	Trade agreements on bio-products	Number of bioproducts trade agreements active	0	2	4	6	8	**15**	0	0	0	0	0		**MIRC**
	5. Establish national RDI centres of excellence	Establish national RDI centres of excellence	Number of established national RDI centres of excellence		5	7	12	15	**20**	2 000	2 000	2 000	2 000	2 000		**NCRST, UNAM, NUST, IUM**

STRATEGIC OBJECTIVE 4(SO4): TO CREATE AWARENESS BIOECONOMY IN DIFFERENT SECTORS

Strategy	Activity	Output	Key Indicators	Baseline	Timelines and Targets per Year (NAD '000)					Budget (NAD '000)					Name of Responsible Agencies/ Institutions	Name of Lead Agencies/ Institutions
					2024 / 25	2025 / 26	2026 / 27	2027 / 28	2028/ 29	2024 / 25	2025 / 26	2026 / 27	2027 / 28	2028/ 29		MAWLR
Valorise indigenous products and services	1. Conduct public awareness campaigns on innovative indigenous products and services	National public awareness programmes on indigenous products and services	Number of public awareness programmes (workshops, seminars etc.) held on innovative indigenous products and services	0	1	4	6	7	9	400	400	400	400	400	Ministry of Sport, Youth and National Service (MSYN), Ministry of Urban and Rural Development (MURD), Ministry of Agriculture, Water and Land Reform (MAWLR), EIF, Ministry of Environment, Forestry & Tourism (MEFT), MICT, Ministry of Industrialisation, Trade and SME Development (MIT), Ministry of Health and Social Services (MoHSS), National Commission of Research, Science, and Technology (NCRST), University of Namibia (UNAM), Namibia University of Science and Technology (NUST), International University of Management (IUM)	
			Number of participants	0	30	50	55	60	70	0	0	0	0	0		
Capacitate the nation on indigenous resources profile	1. Conduct nationwide awareness programmes on the availability of indigenous resources of socio-economic importance	National training workshops, seminars on indigenous resources of economic value	Number of training workshops, seminars conducted on indigenous resources of economic value to Namibia	0	5	10	15	25	30	400	400	400	400	400	Ministry of Sport, Youth and National Service (MSYN), Ministry of Urban and Rural Development (MURD), Ministry of Agriculture, Water and Land Reform (MAWLR), EIF,	MEFT
	2. Document all plant and animal species with potential commercial viability and traditional values	Database of indigenous plant and animal species of commercial values	Number of plant and animal species documented		10	25	45	55	70	40	50	50	50	50	Ministry of Environment, Forestry & Tourism (MEFT), Ministry of Industrialisation, Trade and SME Development (MIT), Ministry of Health and Social Services (MoHSS), National Commission of Research, Science, and Technology (NCRST), University of Namibia (UNAM), Namibia University of Science and Technology (NUST), International University of Management (IUM), MICT	NCRST
Facilitate the integration of Bioeconomy in sectoral policy instruments	1. Conduct awareness to policymakers on Bioeconomy and its benefits	Tailored awareness programmes for policy makers	Number of policymakers participated in awareness programmes	0	15	15	15	15	20	100	100	100	100	100		NCRST
	2. Develop tailored Bioeconomy courses including marginalised communities, women and youth	Designed courses on Bioeconomy	Number of courses developed	0	2	4	4	6	10	100	1000	100	100	100		UNAM, NUST, IUM, VTCs

Appendix 2
Monitoring and Evaluation Framework

Based on the selected Bio-economy strategy activities listed in the Action Plan, it is crucial to define the iterations between the activity's implementation and the information and data generated that show the progress and impact made by the Bio-economy strategy. The Monitoring and Evaluation Framework includes the performance indicators related to biomass production in agriculture, forestry, and fisheries; the biomass processing indicators in the food, feed, and beverage industry, the material used, as well as the biomass energy use. Furthermore, some performance indicators will measure the progress in terms of inputs, outputs, outcomes, and the impact of the biomass-based services in logistics, transport, retail, research, and tourism.

OBJECTIVE 1: TO CREATE VALUE-ADDITION PLATFORMS FOR BIO-BASED PRODUCTS

STRATEGY 1: Promote and support the quality of bio-based indigenous products and services

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-Line	Target	Purpose, Calculation
Amount of funds mobilised.	NCRST, MAWLR	Annually	2024	0	N$ 5 000 000	The total amount of funds mobilised for value-addition initiatives
Number of biomass projects in communal areas	MEFT, NCRST, EIF	Annually	2024	0	3	Count of biomass projects within communal areas participating in the overall biomass value-chain
Number of communal farmers that are members of the communal biomass associations.	NCRST, MAWLR, MEFT, EIF, NGOs, N-BiG	Annually	2024	0	15	A count of the number of communal farmers registered as members of the newly founded biomass association
Number of biomass products produced by communities	NCRST, MAWLR, MEFT, EIF, NGOs, N-BiG	Annually	2024	0	3	A Count of the number of biomass products produced within communities
Number of new infrastructures constructed with modern technologies utilised for sustainable production purposes	NCRST, MAWLR, MURD, MEFT, EIF, MHETI, Universities	Annually	2024	0	2	A count of newly constructed facilities equipped with modern technologies for sustainable production of bio-products
Number of existing infrastructures equipped with modern technologies	NCRST, MAWLR, MURD, MEFT, EIF, MHETI, Universities	Annually	2024	0	2	A count of existing infrastructure equipped with modern technologies for sustainable production of bio-products
Number of SMEs supported at the established technology stations	Attendance registers of tech stations, AMTA, MAWLR	Annually	2024	-	5	Total number of SMEs making use of the established tech stations
Number of users accessing platforms	AMTA, MAWLR	Annually	2024	-	10	Total number of users signed up and active on the established platforms

STRATEGY 2: Enhance products produced through bio-innovation from indigenous biological resources

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-line	Target	Purpose, Calculation
Number of commercialised pharmaceutical products derived from indigenous biological resources	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Regional Councils, Local Authorities	Annually	2024	0	4	A count of the number of pharmaceutical products on the market derived from indigenous resources
Number of patented indigenous traditional knowledge/product	MoHSS, UNAM, NUST, IUM, BIPA	Annually	2024	0	3	Total number/sum of patented indigenous traditional knowledge/products.
Number of developed/ improved medicinal production infrastructure	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Regional Councils, Local Authorities	Annually	2024	1	2	Sum/Number of developed/improved medicinal production infrastructure/

STRATEGY 3: Support the utilisation of high-performing crop varieties and processing of local fresh products

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-line	Target	Purpose, Calculation
Number of processed products produced in line with developed national standards	NSI	Annually	2024		2	A count of locally processed products produced in line with established national standards

STRATEGY 4: Support the development of value chains based on non-timber forest and wildlife products

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-line	Target	Purpose, Calculation
Number of users accessing the platforms	MEFT	Annually	2024	0	5	Count of users signed up and active on the established platforms

OBJECTIVE 2: *TO CONTRIBUTE TOWARDS ENVIRONMENTAL SUSTAINABILITY*

STRATEGY 1: Advance climate-smart agricultural practices that contribute to sustainable agri-food systems

Indicators	Data Collection / Source	Frequency	YEAR/ MONTH	Base-line	Target	Purpose, Calculation

Number of hectares reclaimed from bush encroachment	MAWLR	Annually	2024	10 000	10 000	A measure of agriculturally fit land reclaimed from previously encroached areas
Strategy 2: Promote fossil-free technologies and ecosystem-based monitoring tools						
Indicators	**Data Collection / Source**	**Frequency**	**Year/ Month**	**Base-line**	**Target**	**Purpose, Calculation**
Number of local industries using technologies that capture carbon emission	MEFT, EIF	Annually	2024	0	2	A count of local industries using technologies that capture carbon emission
% Carbon captured by technologies	MEFT, EIF	Annually	2024	0	25 %	A measure of the % of Carbon captured by implemented technologies
Number of developed/ adopted ecosystem monitoring tools	MEFT	Annually	2024	0	2	A count of the developed/adopted innovative ecosystem monitoring tools
Number of Green hydrogen technologies	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Regional Councils, Local Authorities, SMEs, NBiG	Annually	2024		2	A count of green hydrogen technologies developed and available for use locally
STRATEGY 3: Foster the sustainable use of natural resources						
Indicators	**Data Collection / Source**	**Frequency**	**Year/ Month**	**Base-line**	**Target**	**Purpose, Calculation**
Number of certified conservancies, communities, organisations	MEFT	Annually	2024 - 2029	0	5	The total number of certified conservancies, communities, organisations
OBJECTIVE 3: TO IMPROVE BIO-BASED PRODUCTS AND SERVICES THROUGH RESEARCH, DEVELOPMENT AND INNOVATION (RDI)						
STRATEGY 1: Strengthen research that promotes health and agricultural biosciences innovation						
Indicators	**Data Collection / Source**	**Frequency**	**Year/ Month**	**Base-line**	**Target**	**Purpose, Calculation**
Number of plant varieties emanating from research	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Universities	Annually	2024	0	2	Count/sum of improved plant varieties emanating from research
Number of animal varieties emanating from research	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Universities	Annually	2024	0	1	Count/sum of improved animal varieties emanating from research
Number of Research chairs in agricultural and health biosciences innovation emanating from biotechnology RDI	NCRST	Annually	2024	0	1	Sum/count of Research chairs in agricultural and health biosciences innovation emanating from biotechnology RDI
Amount of funds mobilised	NCRST, MHETI, UNIVERSITIES	Annually	2024		N$ 2 000 000	Count/sum of the total funds mobilised for research initiatives
STRATEGY 2: Strengthen research efforts to co-create products with rural communities						
Indicators	**Data Collection / Source**	**Frequency**	**Year/ Month**	**Base-line**	**Target**	**Purpose, Calculation**
Number of agreements between rural communities and researchers	NCRST	Annually	2024	0	5	Count/Sum of agreements between rural communities and researchers
STRATEGY 3: Promote socio-economic-driven research focusing on value addition						
Indicators	**Data Collection / Source**	**Frequency**	**Year/ Month**	**Base-line**	**Target**	**Purpose, Calculation**
Number of trained youth and women groups	MYSNS	Annually	2024	0	5	Count of youth and women trained on value addition techniques
Number of SMEs trained on ABS	MTI	Annually	2024	0	15	Count of SMEs trained in ABS
Number of contracts between SMEs and communities	MEFT, MTI	Annually	2024	0	5	Tally of contracts concluded between SMEs and communities

Number of bio-products trade agreements active	MIRC	Annually	2024	0	2	Number of bio-product trade agreements active
Number of established national RDI centres of excellence	NCRST, MIT, MEFT, MHETI, UNIVERSITIES	Annually	2024	0	5	Count of established national centres of excellence

OBJECTIVE 4: TO CREATE AWARENESS OF BIOECONOMY IN DIFFERENT SECTORS

STRATEGY 1: Valorise indigenous products and services

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-line	Target	Purpose, Calculation
Number of public awareness programmes (workshops, seminars etc.) held on innovative indigenous products and services	MAWLR, MEFT	Annually	2024	0	1	Computation of public awareness programmes (workshops, seminars etc.) held on innovative indigenous products in the communal areas
Number of participants	Awareness campaign attendance records	Annually	2024 - 2029	0	30	Sum/count of participants attending national awareness campaign projects emanating from biotechnology RDI

STRATEGY 2: Capacitate the nation on indigenous resources profile

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-line	Target	Purpose, Calculation
Number of training workshops, seminars conducted on indigenous resources of economic value to Namibia	MEFT	Annually	2024	0	5	Count of training workshops, and seminars conducted on indigenous resources of economic value to Namibia
Number of plant and animal species documented	**NCRST**	Annually	2024	0	10	Tally of plant and animal species documented

STRATEGY 3: Facilitate the integration of Bioeconomy in sectoral policy instruments

Indicators	Data Collection / Source	Frequency	Year/ Month	Base-line	Target	Purpose, Calculation
Number of policymakers participated in awareness programmes	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Regional Councils, Local Authorities, Universities	Annually	2024	0	15	Computation of the number of policymakers participating in tailored awareness programmes
Number of courses developed.	NCRST, MIT, MAWLR, MURD, MEFT, EIF, MHETI, Regional Councils, Local Authorities, Universities	Annually	2024	0	2	A count of the total number of tailored courses developed for policymakers

Appendix 3

Data Collection Template

Data Collection Template for Monitoring and Evaluation

	Value/Number														
	January	February	March	April	May	June	**Total Semester 1**	July	August	September	October	November	December	**Total Semester 2**	**Total Annual**
Research Development and Innovation (RDI)															
Investment (Public and Private)															
Personnel and Skills (Number)															
Patents (Registered patents on Bioeconomy)															
Funds secured from the private sector for RDI															
Number of key stakeholders from various sectors collaborating in RDI															
Number of patented indigenous traditional knowledge/products															
Number of pharmaceutical products from biotechnology															
Number of projects emanating from biotechnology RDI															
Number of publications and intellectual property emanating from biotechnology RDI															
Number of conferences emanating from biotechnology RDI															
Number of research activities/projects conducted on seeds and animal breeds resilient to climate change															
Number of research projects/activities on indigenous medicinal plants, animals, animal products, and micro-organisms for commercialisation															

Number of biodiversity E-commerce platforms developed															
Bioeconomy-related national research budgets	Budget - Share of total budget (%) *Amount in N$ and (% share of total budget)*														
Sector / activity	January	February	March	April	May	June	Total Semester 1	July	August	September	October	November	December	Total Semester 2	Total Annual
Generic Bioeconomy															
Agriculture															
Forestry															
Waste as biomass source															
Food and feed use of biomass (food/feed value chains)															
Energy use of biomass (bio-energy)															
Industrial uses of biomass															
Key enabling technologies (industrial biotechnology)															
Communication, stakeholder involvement															
Other (please specify)															

Environmental sustainability

	January	February	March	April	May	June	Total Semester 1	July	August	September	October	November	December	Total Semester 2	Total Annual
Arable land in hectares for agricultural activities															
Number of hectares reclaimed from bush encroachment															
Number local industries using technologies that capture carbon emission															
Quantity of carbon emitted captured															
Number of ecosystem monitoring tools used for environmental management															

Numbers of certified conservancies, communities, organisations															
Number of eco-friendly certificates issued															

Bioeconomy value-addition and employment creation

	January	February	March	April	May	June	Total Semester 1	July	August	September	October	November	December	Total Semester 2	Total Annual
Number of business trade fairs and conventions involving bio-resource producers organised															
Number of entrepreneurs and business owners who attended the business trade fairs and conventions															
Number of meetings with the retail and informal business sector to ensure that it showcases bio-based products															
Number of retail and informal business owners who attended the meeting dialogue															
Number of training sessions for SMEs and entrepreneurs organised to promote the production and the use of plant fibres and co-products															
Number of SMEs and entrepreneurs who participated in the training in the production and the use of plant fibres and co-products															
Funds secured for supporting the local producers/youth/women to start tanneries for production of shoes and other related products (N$)															
Number of persons/projects/business-funded to initiate production or business of Bioeconomy products															

Production of lump charcoal (ton)/quantity															
Number of youth and women who received funds for the equipment for de-bushing and production of coal (charcoal)															
Amount of funds utilised to facilitate access to market by funding the de-bushing equipment and charcoal production (N$)															
Number of training sessions on charcoal production and packaging of coal															
Number of participants in the training of charcoal production and packaging of coal															
Amount of seed funding for value addition in agricultural produce with a focus on neglected and underutilised crops, microorganisms, and plants, and animals (N$)															
Amount of funding to entrepreneurs in production of seeds and seedlings resilient to climate change															
Animal Feed	Quantity and Value (N$)														
Animal feed produced (ton) in rural areas/informal sector															
Animal feed utilised (ton) in rural areas															
Animal feeds produced from encroached bush															
Number of training sessions on machinery and techniques of animal feed production from bush/plants/trees															
Number of persons trained on machinery and techniques of animal feed production from bush/plants/trees															
National Public Funding allocated to the programme (N$/month/year)															
Agriculture															

Forestry															
Number of training sessions on climate-resilient crops and livestock varieties															
Number of persons trained on climate-resilient crops and livestock varieties															
Number of medicinal production infrastructure/ facilities															
Number of products derived from indigenous medicinal plants, animals, animal products, and micro-organisms for commercialisation															
Number of products from non-timber forest and wildlife products (i.e.: for Marula, Mutete, Manketti, etc.) on the market															

Raising awareness of Namibia's Bioeconomy Strategy

	January	February	March	April	May	June	Total Semester 1	July	August	September	October	November	December	Total Semester 2	Total Annual
Number of scientific conferences on the Bioeconomy organised for the research community															
Number participants at scientific conferences on the Bioeconomy															
Number of training sessions organised for Regional Council members and Constituency Counsellors on the integration of Bioeconomy principles in the regional or municipal strategic and management plans															
Number of participants at the training sessions organised for Regional Council members and Constituency Counsellors on the integration of Bioeconomy principles in the regional or municipal strategic and management plans															

National Biomass Observatory established/ National Botanical Research Institute/Min Agriculture – strengthen or expand the mandate (YES/NO)															
Scientific and Technical Committee/Board appointed (YES/NO)															
Situational Analysis Survey - Carrying out an inventory and prospective analysis of the environmental potential and impacts of using biological resources for the Bioeconomy (YES/NO)															
Inclusion of the Bioeconomy in curricula and courses (YES/NO)															
Establish multidisciplinary teaching and research organisations on Bioeconomy (e.g., 'Bioeconomy Research Institute', chairs), including social and economic issues (YES/NO)															
Number of studies of bio-resources in Namibia's regions conducted															
Number of studies of the effect of the Bioeconomy on the agricultural sector															
Conduct the Mid-term Evaluation (YES/NO)															
Conduct an inventory of indigenous products and services in the communal areas (YES/NO)															
Repertoire and catalogue of the indigenous products and services in Namibia communal areas established (YES/NO)															
Number of mass media programmes on Bioeconomy designed															
Number of mass media/radio/TV shows on innovative indigenous products and services for sustainable agri-food systems, better nutrition,															

and health in the communal areas conducted															
Number of flyers on innovative indigenous products and services for sustainable agri-food systems, better nutrition, and health in the communal areas distributed															
Number of road shows on Bioeconomy															
Number of training workshops, seminars conducted on indigenous resources of economic value to Namibia															
Developed database and catalogue of Namibia indigenous plant and animal species of commercial values with proposed potential areas of research and development (YES/NO)															
Develop/design tailored awareness initiatives for															
key policymakers and government bodies of Bioeconomy and its benefits and risks (YES/NO)															
Number of workshops/seminars on Bioeconomy and its risks and benefits for parliamentarians, and cadres in different Government agencies, and Ministers															
Number of parliamentarians, and cadres in different Government agencies, and Ministers, trained on Bioeconomy and its risks and benefits															
Number of developed courses on Bioeconomy targeting farmers and the marginalised communities, and youths															
Number of farmers and marginalised communities and youths trained on Bioeconomy															

Inauguration of a communication campaign to showcase Bioeconomy products (YES/NO)															
Number of communication campaigns Bioeconomy showcase activities															
Inter-sectoral Working Group established with the extended mandate of monitoring the implementation of the strategy (YES/NO)															

Appendix 4

Policies and Programmes of Institutions Represented in the Bioeconomy Multi-sectoral Working Group (BMWG).

Table 1: Stakeholder role in Bioeconomy and links to Strategic Objectives and Initiatives

POLICIES AND PROGRAMMES				
Organisation	**Policies (if applicable)**	**Programme/initiative**	**Bioeconomy Strategic Focus Area**	**Partners**
AGRA Provision (Pty) Ltd	• None	• Capacity-building in the agricultural sector (including hydroponics infrastructure)	• Cross-cutting issues related to the Namibian Bioeconomy	• Ministry of Agriculture Water and Land Reform (MAWLR) • Agra ProVision • SWAVET • Feedmaster • International Agriculture Academy for Africa • University of Botswana
Chamber of Mines	• None	• Linkages: Erongo Cement, use biomass to power their machines • Support agricultural initiatives in their communities • Phosphate mining: support to the agriculture industry	• Natural-resource management • Cross-cutting issues related to the Namibian Bioeconomy	• B2Gold • Local communities • Ministry of Mines & Energy
Environmental Investment Fund	• National Development Plans (NDPs) • Vision 2030 • National Policy on Climate Change for Namibia, 2011 • National Climate Change Strategy and Action Plan, 2013-2020 • Nature Conservation Amendment Act, (Act 151 of 1996)	• Empower to Adapt: Creating climate-resilient livelihoods through Community-based Natural Resource Management in Namibia (Water security, horticulture, fodder production) • Improving rangeland and ecosystem management practices of smallholder farmers under conditions of climate change in the Sesfontein, Fransfontein, and Warmquelle areas of the Republic of Namibia	• Agriculture Natural Resource management • Cross-cutting issues related to Bioeconomy	• Government Ministries e.g., Agriculture and Environment • Integrated Rural Development for Nature Conservation (IRDNC) • Namibia Development Trust (NDT) • Namibia Nature Foundation (NNF) • Namibia Association of Community-based Natural Resource Management

		(IREMA) Project (fodder production) • Building resilience of communities living in landscapes threatened under climate change through an ecosystem-based adaptation approach (EBA) project (nature-based enterprises) • Climate-resilient Agriculture in three of the Vulnerable Extreme northern crop-growing regions (CRAVE) Project Programmes • Sustainable Use of Natural Resources and Energy Finance (SUNREF) Namibia (agricultural projects) • Sustainable Development Goal Impact Facility (SDGIF)		Support Organisations (NACSO) • German Agency for International Cooperation (GIZ) • UNAM • FNB • Bank Windhoek • Nedbank • Standard Bank • United Nations Development Programme (UNDP)
MeatCo	• Integrated strategic business plan 2021 to 2026 • Meat Corporation of Namibia Act, (Act 1 of 2001) • Meat Industry Act, 1981, (Act 12 of 1981) • Namibia Agriculture Policy, 2015 • Namibia Food Safety Policy, 2015 • Harambee Prosperity Plan II draft prioritises agriculture • Cabinet Directives • Transformation Strategy for the Northern Communal Areas	Under the business plan objectives: • Facilities/infrastructure that service international markets: Norway, China, EU, USA) • Capacity-building for farmers to increase the production of marketable livestock • Improve the efficiency of production by reducing waste (cost of production, power, water; environmental footprint). • Plan on environmental footprint: People, profit, and planet (PPP principle) • Agro-processing and value-addition • Generate foreign exchange earnings for the Namibian economy: Negotiating mutually	• Agriculture • Health • Natural resource management • Cross-cutting issues related to Bioeconomy	• MAWLR (Directorate of Veterinary Services) • Meat Board of Namibia • Ministry of International Relations and Cooperation • Ministry of Industrialisation and Trade & SME Development • Namibia Trade Forum • Namibia Standards Institution • Namibia Industrial Development Agency • Agricultural Bank of Namibia • University of Namibia

	• Namibia Industrial Policy (Growth at Home Strategy) • International Food Safety Standards • COVID-19 Regulations	beneficial agreements with trading partners • Develop markets for NCA products in Africa, the Middle East, and Southeast Asia • Feedlot development and stabilisation of the meat industry in Namibia		• Namibia Ports Authority • Shipping Lines • Namibia Manufacturers Association • Farmers' unions (organised agriculture) • Suppliers of agricultural inputs • International Trading Partners (Competent Authorities and Customers) • Agricultural Trade Forum • Livestock Traders • Marketing Agents • Ministry of Finance (Customs)
Ministry of Agriculture, Water, and Land Reform	• National Agricultural Policy, 2017 • Seed and Seed Varieties Act, (Act 23 of 2018) • Meat Industry Act, (Act 12 of 1981) • Meat Corporation Act 2001 • National Drought Policy of 1997 • Fisheries and Marine Resources (MFMR) policy • Green Scheme Policy • Agronomic Industry Act, (Act 20 of 1992) • Biosafety Act, (Act 7 of 2006) • 2019 National Rangeland Management Policy and Strategy (2012) Agricultural Marketing and	• Crop Improvement Programme • Seed Multiplication Programme • Crop Diversification Programme • Soil, Water, and Plant Nutrition Programme and Post-harvesting Technologies • Emergency livelihood support to drought-affected communities in Namibia • Green schemes • Enhancing small-scale farmers' productivity through increased application of sustainable farming practices. Dry-land and Crop Production Programme (DCCP) • Namibia Agricultural Mechanisation and Seed Improvement Project (NAMSIP 2018 to 2022), project funding is N$1.42 billion	• Agriculture • Health • Natural-resource management • Cross-cutting issues related to Bioeconomy	• Agricultural Business Development Agency (AGRIBUSDEV) • Agro-Marketing and Trade Agency (AMTA) • Benguela Current Commission (BCC) • Food and Agriculture Organisations (FAO) • African Development Bank • SADC Plant Genetic Resources Network Mutation breeding funded by International Atomic Energy Agency (IAEA) • GIZ

	Trade Policy and Strategy • Namibian National Strategic Action Plan for Plant Genetic Resources for Food and Agriculture 2016-2026 Blue Economy (draft)	• Harambee Comprehensively Coordinated and Integrated Agricultural Development Programme (HACCIADEP) • Migrant and Pest Management Programme		
Ministry of Environment, Forestry and Tourism	• Nature Conservation Ordinance, 1975 • Article 95 of the Constitution • Nature Conservation Amendment Act, (Act 151 of 1996) • Forestry Act, (Act 12 of 2001) • Environmental Investment Fund of Namibia Act 2001 • Environmental Management Act, (Act 7 of 2007) • National Policy on Tourism and Wildlife Concessions on State Land, 2007 • National Policy on the Utilisation of Devil's Claw, 2010 • National Policy on Climate Change for Namibia, 2011 • National Policy on Community-based Natural Resources Management, 2013 • Access and Benefit-sharing	• Developing the Biodiversity Economy in selected Landscapes in Namibia (2019-2023). This project funding is approx. 5 million Euros (IKI- GIZ) • GEF Drylands Programme • The Sustainable Wildlife Management (SWM) Programme	• Agriculture • Natural-resource management • Cross-cutting issues related to Bioeconomy	• NCRST • MAWF • NNF • NCE • EIF • UNEP • UNDP • GIZ • USAID

	people in Namibia	• Community Development Programmes		
Ministry of Health and Social Services	• Public and Environmental Health Act, (Act 1 of 2015) • Namibia Medicines and Related Substances Control Act, (Act 13 of 2003) • National Health Act, (Act 2 of 2015) • Access to Biological and Genetic Resources and Associated Traditional Knowledge Act of 2017 • Draft Food Safety Policy	• Food and nutrition guidelines of Namibia. • Food Fortification Programme • Nutritional Programme in the Directorate of Primary Healthcare • ABS Capacity Development Initiative-GIZ	• Health • Cross-cutting issues	• NIP • Namibia Standards Institution (NSI) • Namib Mills
Ministry of Industrialisation, Trade and SME Development	• Growth at Home Strategy • Revised National Quality Policy 2020-2025	• Sector growth strategies (charcoal, cosmetics, biomass value chains, invader bush)	• Agriculture • Health • Natural-resource management • Cross-cutting issues related to Bioeconomy	• GIZ • UNIDO
Ministry of Higher Education Training and Innovation	• Research Science and Technology Act, 2004 • Vocational and Training Act 2008	• Implement diverse programmes through seven public entities	• Cross-cutting issues related to Bioeconomy	• NTA • NCRST • NUST • UNAM • Namibia Qualification Authority (NQA) • National Council of Higher Education (NCHE) • Namibia Students Financial Assistance Fund (NSFAF) • Vocational Training Centres (VTCs)

	Act, (Act 2 of 2017) • National Climate Change Strategy and Action Plan, 2013-2020 • National Tourism Investment Profile 7 Promotion Strategy 2016-2026 • National Strategy on Sustainable Management of Bush Resources in Namibia (draft: submitted to MEFT)			
Ministry of Fisheries and Marine Resources	• STISA 2024 • Marine Resource Act, (Act 27 of 2000)	• African Continental Free Trade Area (AfCFTA)	• Health • Natural-resource management • Cross-cutting issues related to Bioeconomy	• CEAFO • International Commission for the Conservation of Atlantic Tunas (ICAT) • Benguela Current Commission (BCC) • FAO
Ministry of Gender Equality, Poverty Eradication and Social Welfare	• International Conventions, Protocols and Declarations Elimination of Discrimination against Women (CEDAW) 1979 • SADC • Declaration on Gender & Development (1997) • SADC Protocol on Gender and Development (2008) • A draft white paper on the rights of indigenous	• Ensure gender equality and attainment of girls' and women's empowerment • Mobilise communities towards economic empowerment and skills development. • Grant marginalised programmes (1. Livelihood support (feeding programme, resettlement of communities, acquisition of land, projects, feeding programme) (2. Education support) • Special programmes for vulnerable communities • Food Bank Namibia Programme	• Cross-cutting issues related to Bioeconomy	• UN

Ministry of Mines and Energy	• Energy Policy • Renewable Energy policy	• Use of energy from biomass (invader bush) • Municipal waste (use as bioenergy)	• Natural-resource management • Cross-cutting issues related to Bioeconomy	• NamPower • City of Windhoek, • GIZ, • Electricity Control Board, • UNDP
Ministry of Urban and Rural Development	• Rural development policy • Regional and Local Economic Development White Paper Policy (RLED)	• Microfinancing • One Region One Initiative • (Ohangwena Ximenia sp. processing plant) • Potential of natural resources endowments	• Agriculture • Health • Natural resource management • Cross-cutting issues related to Bioeconomy	• Japan International Corporation Agency (JICA) • European Union (EU)
Namibia Agronomic Board	• NAB Strategic Plan • Five-year strategy on value chains • HMP scheme/Growth at Home Strategy • Grain Marketing Scheme (prices for controlled crops/reduce turnaround time)	• Establish an agro-information hub • Conduct research • Publications • Database (producer, importer/exporter) • Provision of quarterly statistics (production focus)	• Agriculture • Health • Natural-resource management • Cross-cutting issues related to Bioeconomy	• Farmers' unions/association • Producers/ processors • Input suppliers/ • Seed suppliers
NamPower	• National Energy Policy • NamPower Strategic Business Plan • National Integrated Resource Plan (NIRP) • NDP5 • V2030 • National Renewable Energy Policy • HPP I & II	• The Lüderitz Wind Power Plant • Otjikoto Biomass Power Station • Firm Power Project • Baynes Hydropower Project	• Agriculture (biofuel off-taker) • Cross-cutting issues related to Bioeconomy	• GIZ • MURD • MEFT • MME • ECB • MAW&LR
Namibia Biomass Industry Group	• National Strategy on Sustainable Management of Bush Resources in Namibia (submitted to MEFT)	• Representing bush biomass industry (Upscaling sustainable bush control and biomass utilisation) • Capacity building in sustainable bush control and biomass utilisation	• Agriculture • Natural resource management • Cross-cutting issues related to Bioeconomy	• Ministry of Environment Tourism and Forestry (METF) • Namibian Nature Foundation (NNF) • NamPower • GIZ

		• Advisory Services, Training, Industry qualification development • Bush biomass value-chain market development (local & international) • Bush harvesting and processing technology testing and improvement • Supporting the development of a National Strategy on sustainable management of bush resources in Namibia • Facilitation of bush biomass R&D		• Namibia Breweries Limited • Ohorongo Cement • NTA • UNAM • NUST
Namibia Chamber of Environment (NCE) **Namibia Nature Foundation (NNF)**	• Blue Economy (draft) • Fisheries and Marine Resource (MFMR) policy • Article 95 of the Constitution • Paris Agreement • NDC (COP): Technical advisor • UNCCD Third Programme • UNCBD (NBSAPII): COP post-2020 framework-prevention of adverse effect on biotechnology • Access and Benefit-sharing Act • Forest Act • Nature Conservation Ordinance • National Policy on the Utilisation of Devil's Claw, 2010 • National Policy on Tourism and	• Bush-based biomass sector: drafting National Strategy on Sustainable Management of Bush Resources in Namibia • Environmental and economic assessment of postharvest measures (cost-benefit analysis) • Fisheries sector (inland sustainable fishing, establishment of fish reserves) – in Kavango-Zambezi (KAZA) Trans-frontier Conservation Area • Marine: reduce the impact of sea birds (Albatross Task Force) • Forest management: Support community forests in sustainable use/drafting management plan • Work with CBOs to produce bio-based products (study with the World Bank) • IKS bio-trade report using indigenous products for food and medicine	• Agriculture • Natural-resource management • Cross-cutting issues related to Bioeconomy	• NamPower (Biomass power plant) • B2Gold • Fisheries association • MFMR • MEFT • MAWLR • MME • MIT • GIZ BCBU project • GIZ Bioeconomy project (MEFT) • USAID • EU • NACSO • IRDNC • Nedbank • Forest (certification) stewardship scheme

	Wildlife Concessions on State Land, 2007 • National Policy on Community-based Natural Resources Management 2013	• Project on research on cosmetics products with a Zambian company implement in Kavango and Zambezi. • Sustainable harvesting of Devil's Claw (established value chain) • Conservation Agriculture project with NOA • CSA use of climate-resilient varieties of crops (did a feasibility study in Kavango and Zambezi • Support CBNRM under NACSO, in partnership with WWF: Support conservancies, value of rhinos		
Namibia University of Science and Technology (NUST)	• Strategic Plan (5 years) • Strategic Plan at faculty level (Health and Applied Sciences)	• Tapping into Bush Biomass resources (5-year initiative on contributing Namibia's food supply) • Entrepreneurship project for youth • Biomass utilisation by sustainable harvesting technologies and CSA (use of Moringa and other indigenous plants) • Phytobiology project (screening of plants for use in treatment) • NUST to establish an institute of food security • Post-harvest loss management using local technologies	• Cross-cutting issues related to Bioeconomy	• METF • MAWLR • HEI (local & international) • Local communities (strong engagement on projects) • NEI
National Commission on Research Science & Technology	• Research Science and Technology Act, 2004, (Act 23 of 2004) • Biosafety Act, 2006 (Act 7 of 2006) • RST Regulation of 2011	• Biotechnology Testing and Research Facilities • Demola Namibia • Innovation and Technology Development Programme • Conducting of Research and Development and Innovation Indicators Survey	• Agriculture • Health • Natural resource management • Cross-cutting issues related to Bioeconomy	• METF • MAWLR • HEI (local and international) • NUST • UNAM • SAIS • Finnish Embassy • UNEP/GEF • FAO

	• Biosafety Regulation of 2018	• Management of the research and development calls towards value addition • National RSTII infrastructure needs analysis/survey • Development of IKS Policy • Documentation of Indigenous Knowledge • Establishment of National IKS database • Science Demonstration Centres • Research registration services		
University of Namibia (UNAM)	• Strategic Plan 2019 to 2024 • (Faculty level strategic plans)	Four themes: • Food Security and Nutrition ○ *Breeding of crops* ○ *Agri-entrepreneurship hub (commercialisation platforms)* ○ *Bush value-chain development in Namibia (funded by RUFORUM)* ○ *Desert Agriculture* ○ *Climate-smart Agriculture pilot project in Ogongo* ○ *Food processing plant* ○ Livestock fodder production (promote and produce our fodder • Shared scientific research and labs (testing) ○ *Collaboration between HEIs (toxicology, genetics, tissue culture laboratory for the propagation of seeds)* • Technology and innovation development ○ *Fourth industrial revolution (4IR): use high throughput computing to contribute to value addition* • One Health Centre of Excellence • Zoonosis and vector-borne diseases • Medicinal products research	• Cross-cutting issues related to Bioeconomy	• RUFORUM • Finnish Embassy • NUST • MAWLR

Ohlthaver and List (O&L) Group of Companies *Organic Energy Solutions (PTY) LTD*	• Strategic plans of the different companies (subsidiaries)	• Bush biomass	• Agriculture • Health • Natural resource management • Cross-cutting issues related to Bioeconomy	• Ministry of Environment Tourism and Forestry (METF) • Namibian Nature Foundation (NNF) • NamPower • GIZ • Namibia Breweries Limited • Ohorongo Cement
O&L Group: *Namibia Dairies (Pty) Limited*		• Biogas plant in Mariental		• Electricity Control Board • Mariental Municipality
O&L Group: *Namibia Breweries Limited*		• Barley production • Biofuel		• N-BiG • METF • Organic Energy Solution • MAWLR
O&L Group: *Hangana Seafood (Pty) Limited*		• Abalone production		• MFMR
O&L Group: *Next Century*		• Renewable energy		• MME • ECB • NamPower • Regional Electricity Distributors

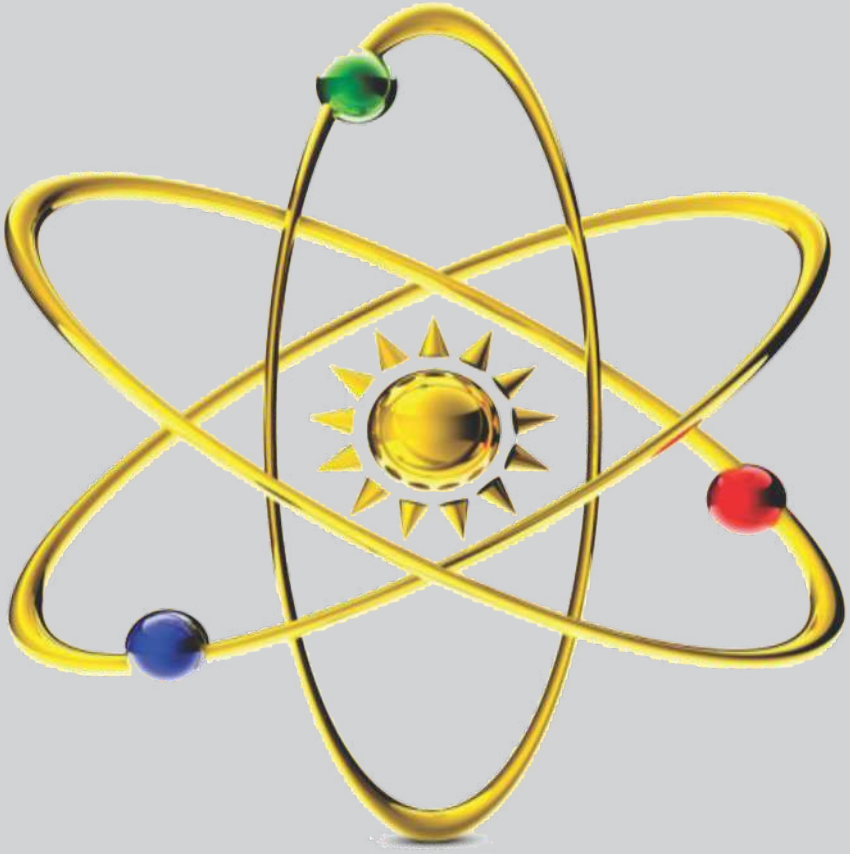
Appendix 5

Bioeconomy Multi-sectoral Working Group (BMWG):

1. Dr. Paulus Mungeyi, NCRST Chairperson of the BMWG
2. Mr. Vincent Nowaseb, NCRST
3. Ms. Hilde Amputu, NCRST
4. Dr. Natascha Cheikhyoussef, Ministry of Higher Education, Technology and Innovation
5. Ms. Helen Amutoko and Mr Siegfried Bandu! Aebeb, Ministry of Sport, Youth and National Service
6. Mr. Titus Endjala and Ms. Lahja Hipondoka, Ministry of Urban and Rural Development
7. Ms. Remmie Hilukwa, Ministry of Agriculture, Water and Land Reform
8. Mr. Kemanya Elias Natangwe and Ms. Leana van Wyk, Ministry of Fisheries and Marine Resources
9. Mr. Timoteus Mufeti and Mr. Olimpio Nhuleipo, Ministry of Environment, Forestry and Tourism
10. Dr. Michael Humavindu, Ministry of Industrialisation and Trade and SME Development
11. Mr. Vasco Munsu, Ministry of Health and Social Services
12. Mr. Filimon Shiimi, Ministry of Gender Equality, Poverty Eradication, and Social Welfare
13. Mr. Abraham Hangula, Ministry of Mines and Energy
14. Ms. Lauren Davidson, Chamber of Mines
15. Mr. Progress Kashandula, The Namibia Biomass Industry Group (N-BiG)
16. Mr. Gero von der Wense (Organic Energy Solutions (Pty) LTD) and Ms. Anna Kankodi (Namibia Dairies (Pty) LTD), O&L Group of companies
17. Mr. Pieter Stoman, Agra Limited
18. Mr. Fanie Badenhorst and Dr Francois Slabbert from FabuPharm (Pty) LTD
19. Ms. Loide Uahengo, Namibia Agronomic Board
20.Mr. Isaac Nathinge Meat Corporation of Namibia
21. Mr. Lot Ndamanomhata and Mr. Sakeus Shilomboleni, Environmental Investment Fund (EIF)
22. Ms. Juliette Perche, Namibian Nature Foundation (also representing Namibian Association of CBNRM Support Organisations (NACSO) and Namibia Chamber of Environment)
23. Dr. Eino Mvula, Namibia Water Corporation (NamWater)
24. Ms. Connie Pandeni, Namibia Power Corporation (NamPower)
25. Prof. Percy Chimwamurombe, Namibia University of Science & Technology
26. Dr. Simon Angombe and Dr. John Sifani, University of Namibia

FAO technical team

1. Ms. Anne Bogdanski, FAO Head Quarters, Rome
2. Ms. Marta Gomez San Juan, Head Quarters, Rome
3. Ms. Ndaindila Haindongo, Head Quarters, Rome
4. Mr. Eugene Kanguatjivi, FAO Namibia
5. Mr. Ferdinand Mwapopi, FAO Namibia
6. Dr. Mwangala Nalisa, FAO Namibia consultant
7. Ms. Alina Nghihalwa, FAO Namibia consultant, and
8. Prof. Honoré Kabwebwe Mitonga, FAO Namibia consultant



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