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National Commission On Research Science & Technology

Harnessing the 4th Industrial Revolution: A need for the development of a National Bioeconomy Strategy.

By

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27 February 2020

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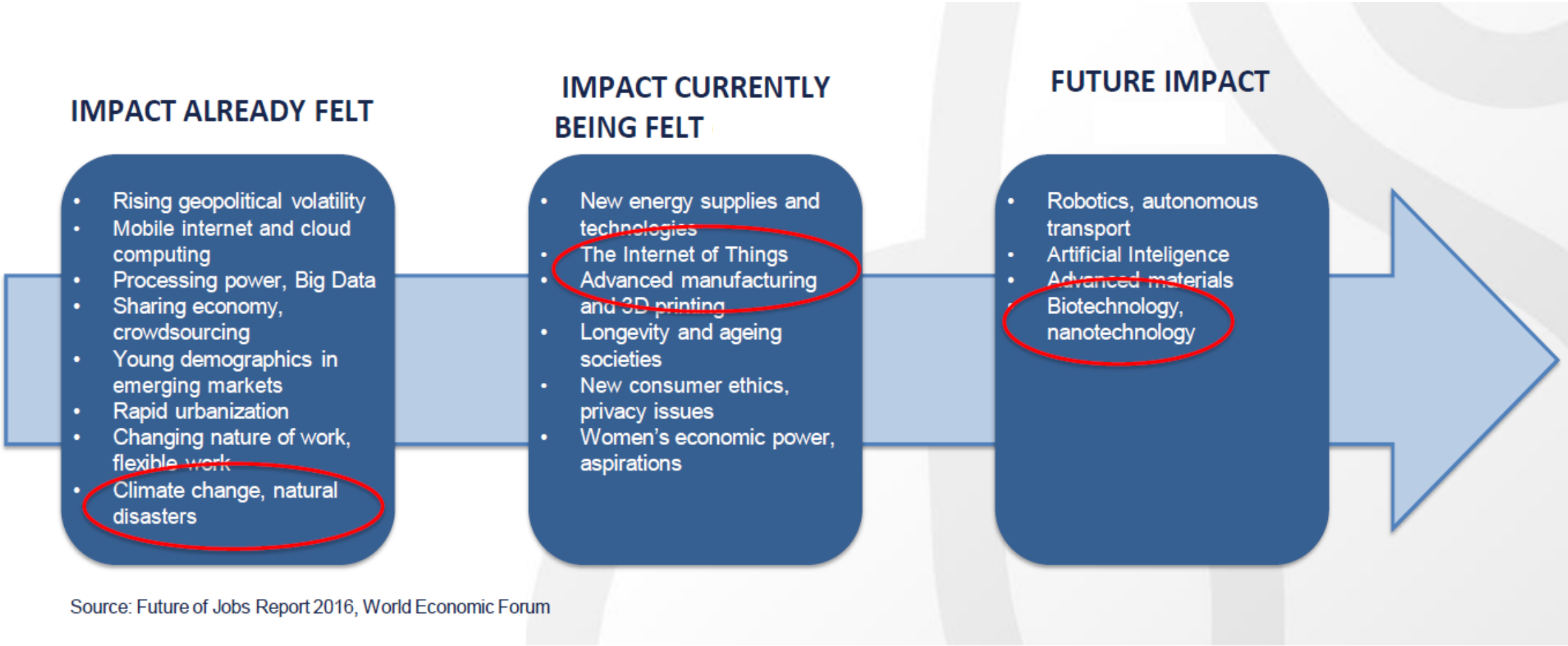
Outline

- Bioeconomy definition
- Bioeconomy strategy development background
- Bioeconomy Focus area
- Bioeconomy strategy Development Process
- Bioeconomy strategic goals
- Planned Activities

Industry 4.0



Source: Future of Jobs Report 2016, World Economic Forum

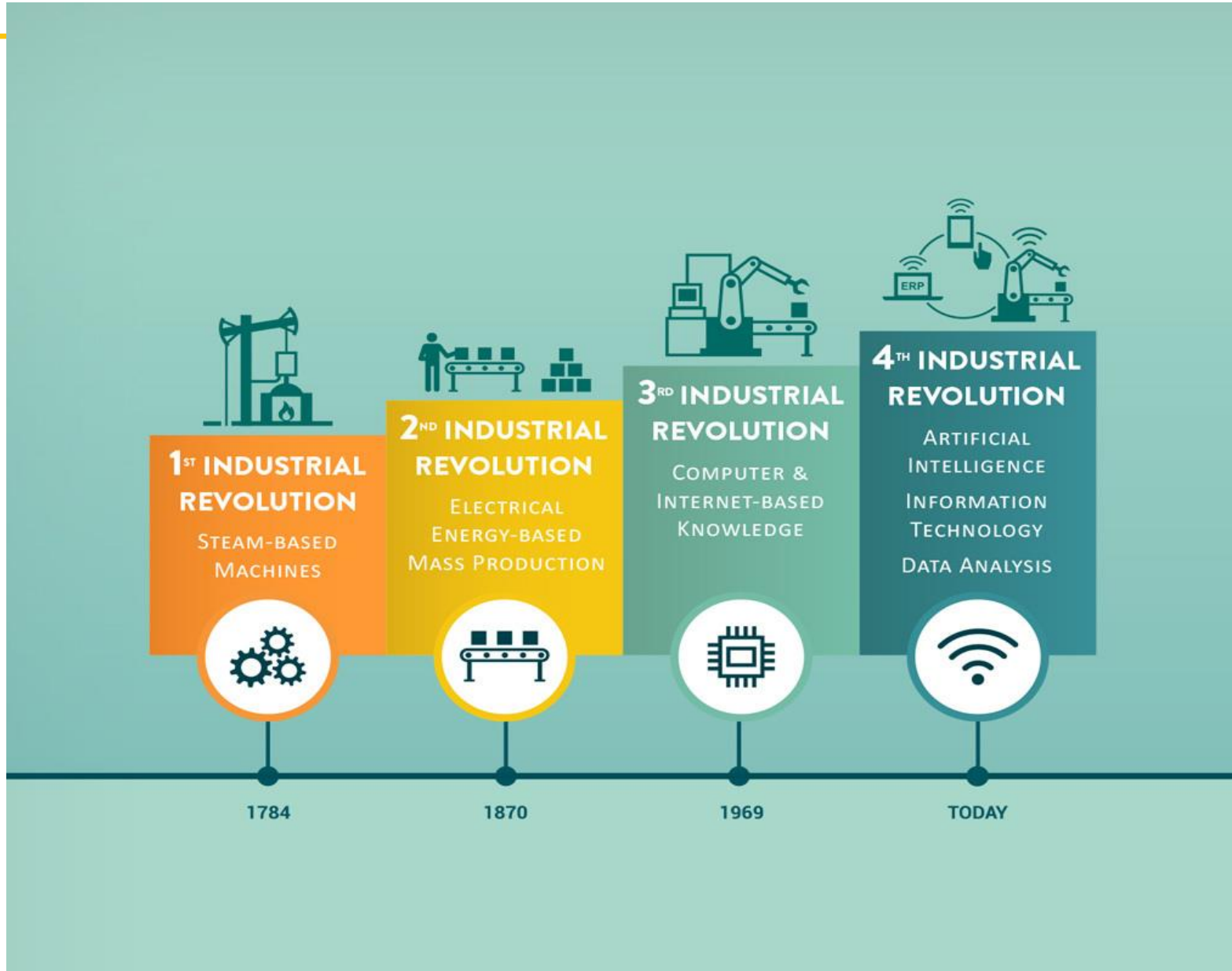
What We Know

Challenge in the 21st Century

- Climate Change
- Population growth
- Unsustainable utilization of natural Resources.

Bioeconomy as a Remedies

- Renewable and Bio-base materials (sustainable).
- Technologies (including Bio) lead to fusion of industries (Biopharmaceutical, Nanotechnology etc.)



What is Bioeconomy?

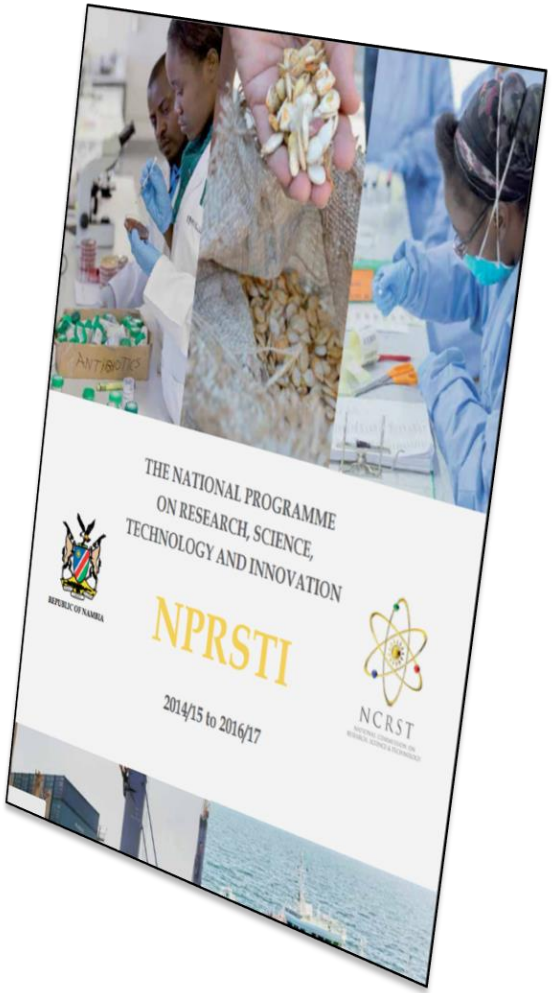
Global Bioeconomy Summit (2018), define ***Bioeconomy*** *as the production, utilization and conservation of biological resources, including related knowledge, science, technology, and innovation, to provide information, products, processes and services across all economic sectors aiming toward a sustainable economy."*

- Bio-economy is about exploiting synergies and considering hard **trade-offs** between the food system and other parts of the economy that depend on biological resources and processes for the production of goods and services.
- It requires integration of policies and actions across ***agriculture, forestry, processing industries, health*** and other sectors.

Policy framework Background

How can Namibia take advantage of advances in Bioeconomy to harness the 4th Industrial Revolution ????

- Biotechnology was a priority area in the NPRSTI 2014/15 to 2016/17;
- Biotechnology policy of 1999 focuses on biosafety of modern biotechnology;



Background cont...

The Bioeconomy Strategy 2020/21 to 2025/26 sets the scene for implementing programmes and initiatives that will help Namibia take advantage of innovation in the Biotechnology and other related sectors.

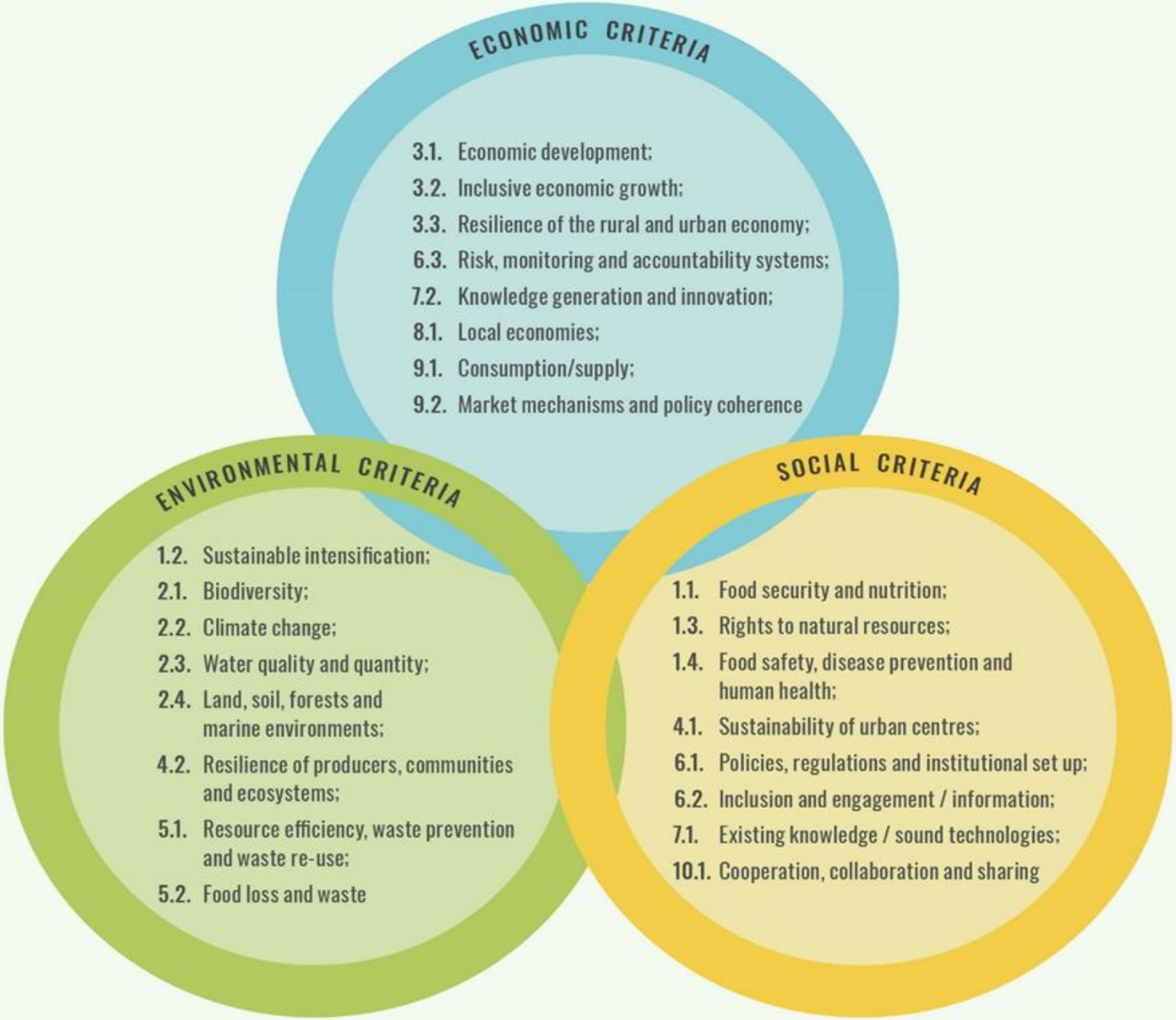
Bioeconomy cuts across the sectors that speak to issues of

- health,
- food security and nutrition
- manufacturing sector

Bioeconomy strategy will promote the sustainable use of biological resources and address critical gaps in industries toward soci-economic advancement.

➔ early stage interventions of product development.

Aspirational Principles and Criteria for Sustainable Bioeconomy (FAO, 2019)



Background cont...

Benchmarked with different countries

- Australia
- **Finland**
- **Germany**
- India
- Ireland
- Malaysia ➔➔➔➔➔
- Netherlands
- Singapore
- South Africa➔➔➔➔
- **Sweden**
- Tanzania
- **UK**
- USA

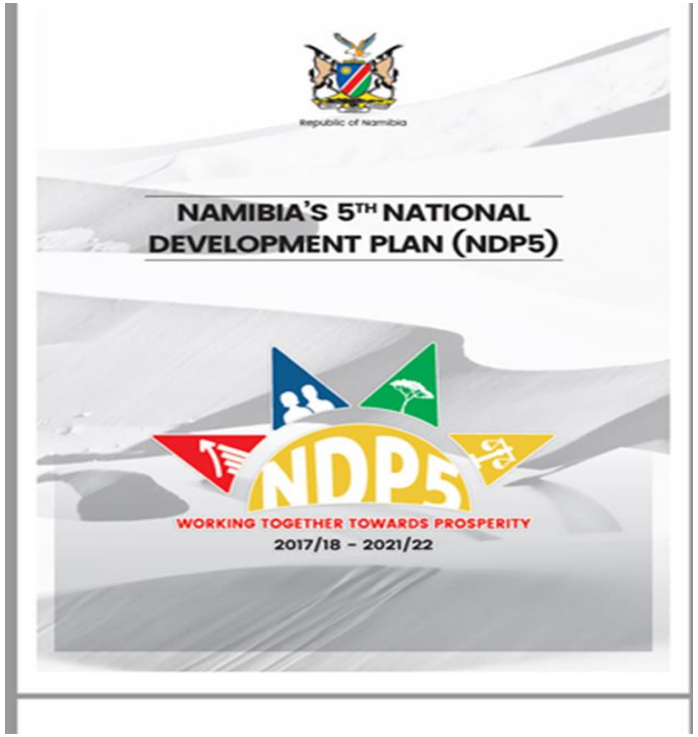
- **IKS value addition**
- **Tech Transfer Platform**
- **Industrial Biotechnology**

Poverty reduction

- ❑ ***Agriculture***
- ❑ ***Health***
- ❑ ***Manufacturing/ value addition***

- ❑ **NDPs**
- ❑ **HPP**
- ❑ **VISION 2030**

Focus Areas



Agricultural Biotechnology

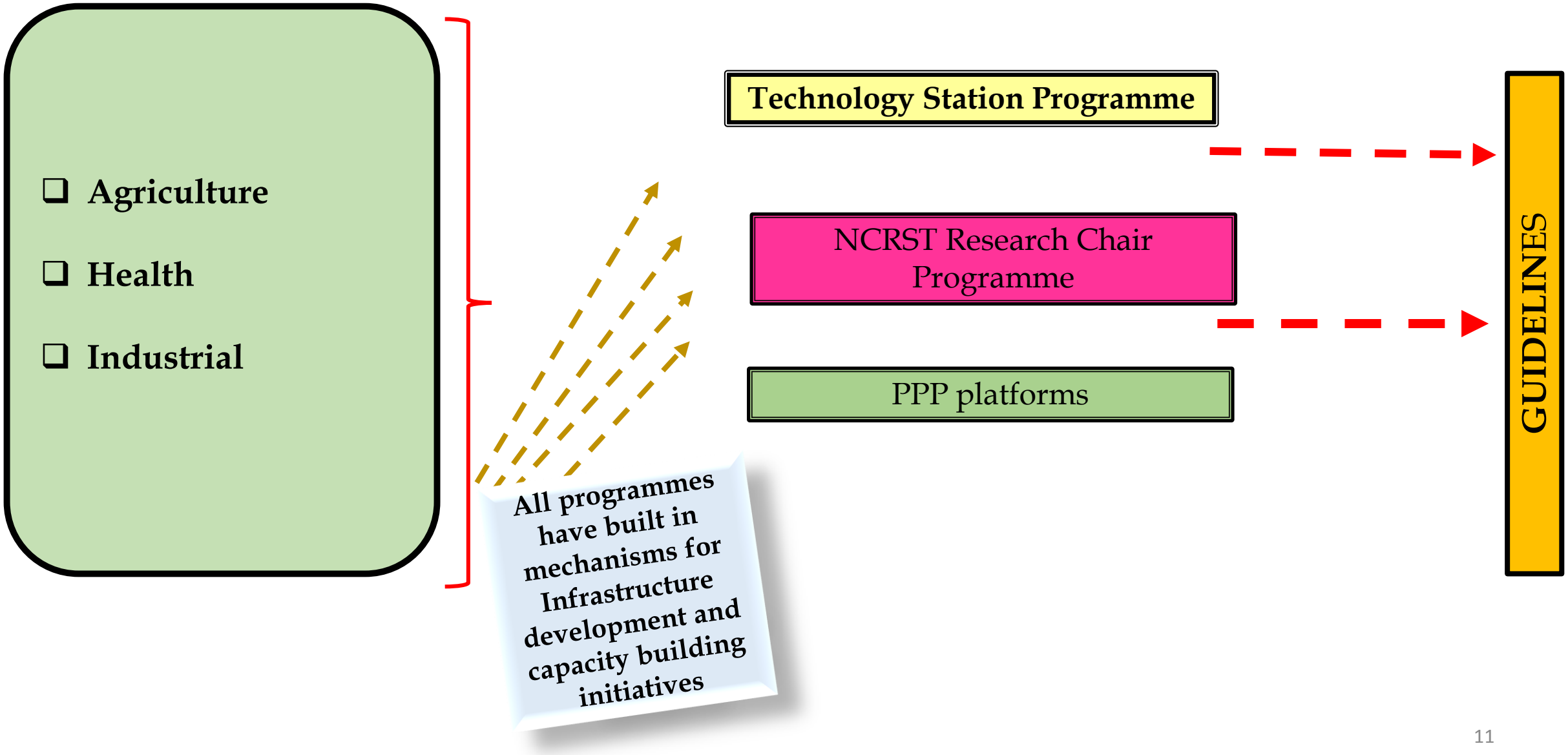
Health Biotechnology

Industrial Biotechnology

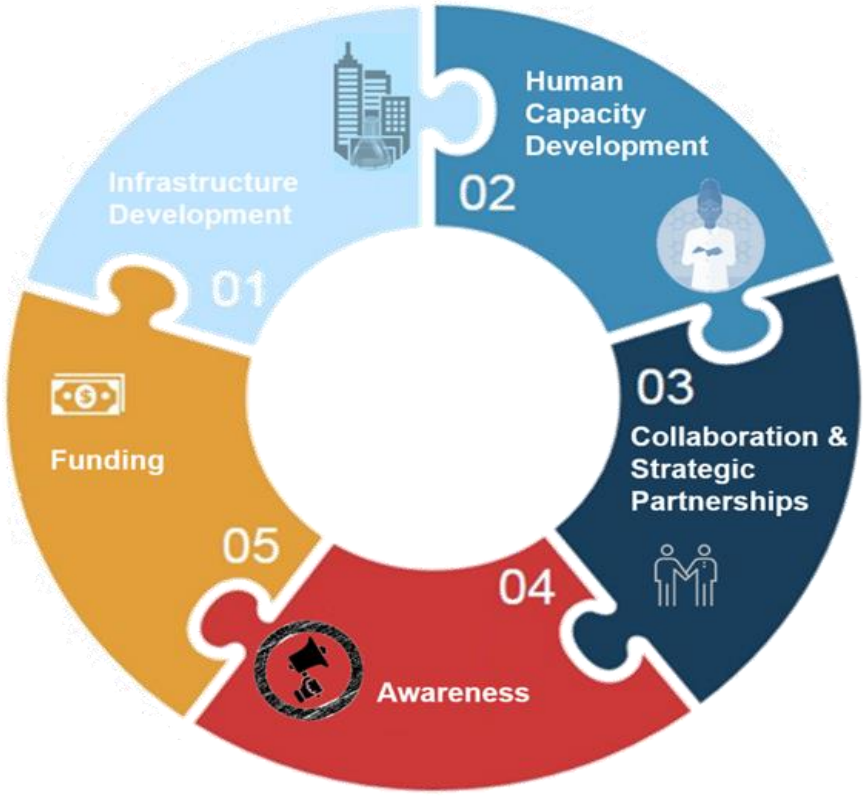
Focal areas must incorporate aspects of:

- Infrastructure Development
- R&D and Technology transfer platforms
- Human Capital Development

BIOECONOMY STRATEGY FRAMEWORK



Reviewed Goals placed under 5 categories



- Agriculture
- Health
- Industrial

Strategic Objective 1:

Develop and maintain infrastructure that fosters bioinnovation and drives competitive research outputs.

	Strategic Initiatives
Agricultural Bioinnovation	**1.** Establish living biotechnology laboratories and science parks to demonstrate the whole bioinnovation value chain **2.** Optimize agriculture research stations to promote bioinnovation outputs
Health Bioinnovation	**1.** Establish platforms for drug discovery and design, and development of diagnostic tests related to communicable and non-communicable diseases (for example: HIV/AIDS, Malaria and TB, cancer, diabetes, etc.) **2.** Establish technology transfer programmes **3.** Increase (bio)innovative products with improved nutritional profiles and services derived from R&D in health biotechnology

Strategic Objective 1:

Develop and maintain infrastructure that fosters bioinnovation and drives competitive research outputs.

	Strategic Initiatives
Cross-Cutting	1. Establish living biotechnology laboratories and science parks to demonstrate the whole bioinnovation value chain 2. Increase products and services derived from R&D in health biotechnology 3. Empirical evidence to establish baseline (refer to MoHSS disease profile) 4. Establish technology transfer programmes; 5. Facilitate the production of (bio)innovative products with improved nutritional profiles using a wide range of techniques that have undergone approval by the relevant authorities in Namibia; 6. Ensure access and sustainability of bioinnovation facilities nationwide.

Strategic Objective 2:

Develop a critical mass of highly competent biotechnologists, bioengineers and bioentrepreneurs that can be deployed and efficiently utilized in the industrialization of the bioeconomy

	Strategic Initiatives
Agricultural Bioinnovation	1. Improve and coordinate high-calibre research and innovation geared toward agriculture bioeconomy
Health Bioinnovation	1. Exploit biological, genetic resources and advancement of/ Value addition of Indigenous knowledge systems to contribute to reducing the burden of communicable and non-communicable diseases (HIV/AIDS, Malaria, TB, and Cancer & Diabetes). 2. Establish harmonised processes to capacitate indigenous knowledge holders on technology transfer and commercialization.
Industrial Bioinnovation	1. Develop sufficient and higher calibre industrial biotechnology innovators 2. Develop a curriculum that is tailored to industrial biotechnology, responsive to Namibia's needs.
Cross-Cutting	1. To develop training programs dedicated for bioenterpreneurs.

Collaboration & Strategic Partnerships 	**Strategic Objective 3:** **Promote bioinnovation arising from the development and application of biotechnology by strengthening collaborations with strategic partners.**
	Strategic Initiatives
Cross-Cutting	1. Ensure networking and synergy between HEIs and Industry 2. Negotiate funding instruments with financial institutions 3. Establish marketing, and M& E mechanisms 4. Create and promote technology transfer platforms to enable linkages between various relevant role players e.g. SMEs, academia, industries and government departments/agencies 5. Establish a platform for capitalization and sustainable funding 6. Coordinate of potential key stakeholders within the bioinnovation ecosystem 7. Develop human capacity in bioinnovation through national and international collaborative initiatives. 8. Develop a niche industrial biotechnology sector through a facilitated inter-ministerial task workforce informed by research 9. Establish platforms between biotechnology researchers and vocationally skilled people to design processing prototype equipment.

	**Strategic Objective 4:** **Promote public understanding of Biotechnology in Namibia**
	Strategic Initiatives
Cross-Cutting	1. Popularize Biotechnology as a field of study through tailor made Public awareness programmes 2. Promote innovation in biosciences through annual festivals and competitions
	**Strategic Objective 5:** **To support bioinnovation and bio-entrepreneurship through Alignment and streamlining of resourcing, capitalization, policy and regulation of the environment**
	Strategic Initiatives
Agricultural Bioinnovation	1. Facilitate the development of national quality standards for IKS products. 2. Facilitate valorisation of biological, genetic resources and indigenous knowledge and assist the producers of IKS products to improve quality.
Health Bioinnovation	1. Promote ethnomedicine through Bioinnovation taking into account Access & Benefit Sharing of genetic resources.
Industrial Bioinnovation	1. 1. Establish a conducive environment for entrepreneurs and companies to practice industrial biotechnology 2. 2. Support the establishment of biotechnology SME industry that are involved in the innovation based on indigenous knowledge/ and adding value to local products/processes and services

Stakeholders' Engagement Outcomes

Table F: GDP by activity Current prices – percentage contribution to GDP

Industry	2016	2017
Agriculture and forestry	3.4	4.5
Livestock farming	2.0	2.9
Crop farming and forestry	1.4	1.5
Fishing and fish processing on board	2.7	2.5
Mining and quarrying	11.8	12.1
Diamond mining	7.4	7.7
Uranium	1.1	0.7
Metal Ores	2.9	3.1
Other mining and quarrying	0.5	0.6
Primary industries	**18.0**	**19.1**
Manufacturing	11.0	10.8
Meat processing	0.4	0.2
Grain Mill products	1.0	0.9
Other food products	1.9	1.9

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Stakeholders' Engagement Outcomes

- Identify recurrent common objectives and key areas or sectors;
- Showcase good model strategies in different areas such as the blue economy one;
- Show what worked and what did not work/ challenges in other strategies;
- Include how to scale-up already existing activities; identify what is missing that can contribute to the NDP5 and other development strategies, in a synergetic way and giving everyone a role;
- Include how to mainstream sustainability into traditional and new bioeconomy sectors; and
- Highlight areas of potential future trade-offs and synergies right from the beginning

Biodiversity Economy in selected Landscapes

Outcome indicator 0.1:

The area of protected landscapes is increased.

Outcome indicator 0.2 :

More than half of the eco-entrepreneurs involved in the eco-entrepreneur support measures (WP I.4) have improved the value addition of their enterprises.

Outcome indicator 0.3:

50% of the landscape associations which cooperate with the project have implemented effective conservation measures outlined in their new or revised management plans.

THE PROJECT AIMS TO DEVELOP THE BIODIVERSITY ECONOMY IN SELECTED LANDSCAPES. THE FRAGMENTED SYSTEM OF CONSERVATION AREAS IS TRANSFORMED INTO AN EFFECTIVELY COORDINATED LANDSCAPE APPROACH IN WHICH THE INHABITANTS BENEFIT FROM A VIBRANT BIODIVERSITY ECONOMY BASED ON THE SUSTAINABLE USE OF BIODIVERSITY.

Output I
Landscapes are established and underpin the biodiversity economy

Output II
Biodiversity-relevant sectors and value chains are greened and supported by economic incentive schemes

Output III
The biodiversity economy is well coordinated, monitored and up-scaled

Output IV
Key actors at landscape, sector and national level are empowered to further develop the biodiversity economy

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SUSTAINABILITY IN BIOECONOMY DEVELOPMENT

The Marula tree (*Sclerocarya birrea*) Marula sector development plan

environmental affairs
Department: Environmental Affairs
REPUBLIC OF SOUTH AFRICA

THE ABS CAPACITY DEVELOPMENT INITIATIVE

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Economic Affairs SECO

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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The Marula tree (Sclerocarya birrea) Marula sector development plan

- ✓ Marula is a rich natural transboundary resource in southern Africa with ecological, economic and social significance.
- ✓ It is widely distributed in a broad and varied landscape, interacting with many different cultures, perceptions and belief systems.

- ✓ The sector has potential to stimulate rural development, job creation and new export markets (**with spin-off benefits in technology, innovation, development of small businesses and skills development**).

- ✓ Development of the Marula sector must take account of ABS regulations, conservation and sustainable use, and indigenous knowledge.

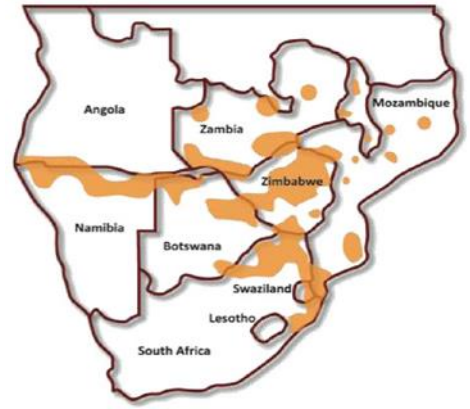
- ✓ The sector will require evidence-based ecological, economic and social baseline data and monitoring.

- ✓ Commercialisation of the Marula sector will include domestication and cultivation to improve genetic strains, quality and reliability.
- ✓ Short term market access initiatives may be assisted by development of a representative platform or prototypes.
- ✓ Conservation and sustainable use need capacity development, training and funding to protect the resource for future generations taking into account climate change.

P1,P5,P3

Food security and nutrition

P9



Efficiency in the use of resources and biomass

P4,P8,P7

Existing local Knowledge

P10

Effective governance

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Other initiatives on the pipeline

BioInnovation Africa equitable benefit sharing for biodiversity conservation	
Improving efficiency of national ABS frameworks	Supporting conservation & sustainable use
Biodiversity-based supply chains for sustainable development	Reflecting biodiversity-based value chains in development cooperation

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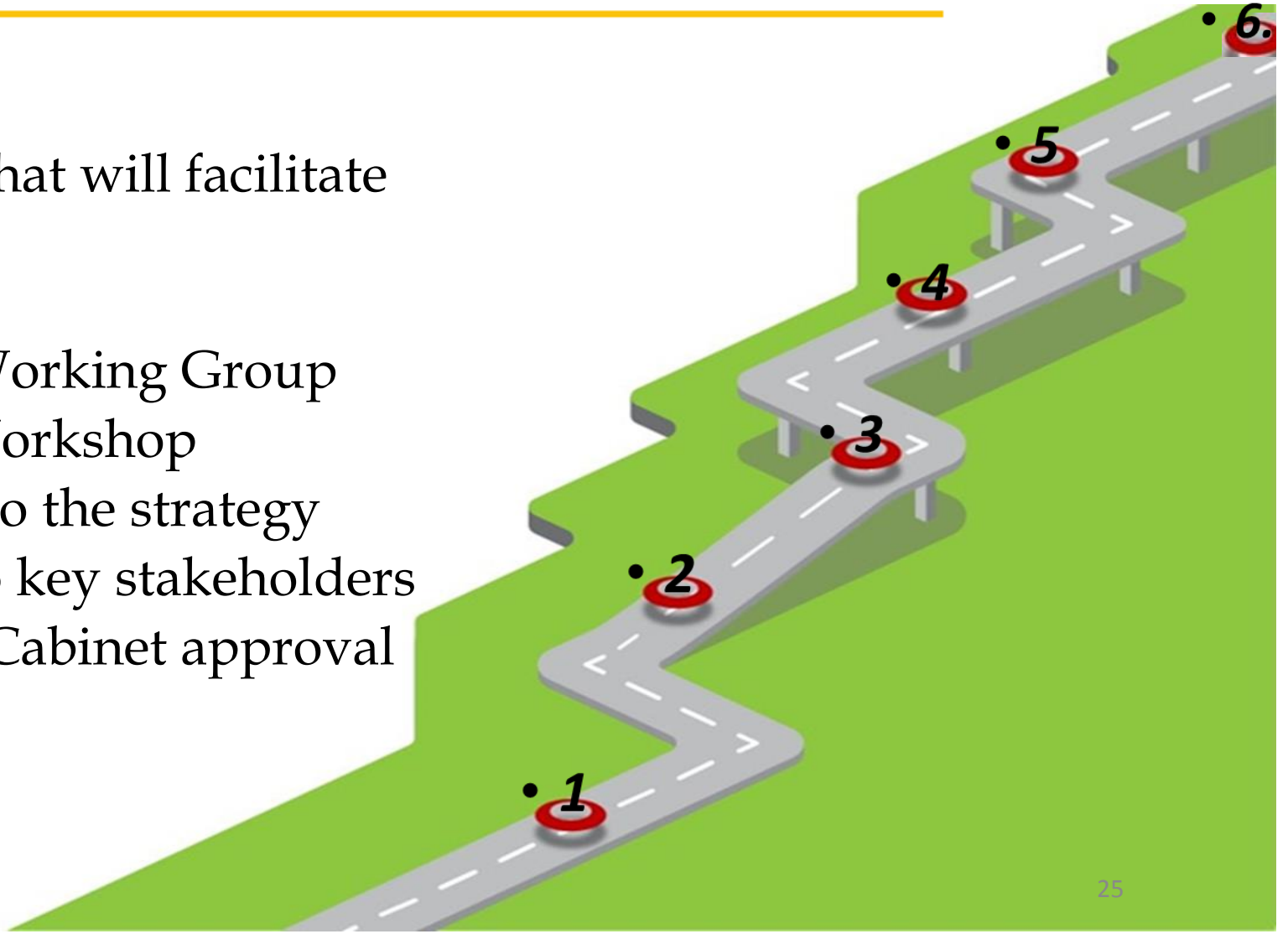
The road to National Bioeconomy Strategy

1. Appoint a national consultant that will facilitate the dialogue process
2. Stocktaking exercise.
3. Establish a multi-stakeholder Working Group
4. Preparatory Key stakeholder Workshop
3. Final Consolidation of input into the strategy
5. Presentation of draft strategy to key stakeholders
6. Submission to the Minister for Cabinet approval



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