STRATEGY FOR GRAND CHALLENGES MALAWI

2023-2028

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ABBREVIATIONS AND ACRONYMS

AESA	ACCELERATING EXCELLENCE IN SCIENCE IN AFRICA
AU	AFRICAN UNION
AI	ARTIFICIAL INTELLIGENCE
AUDA-NEPAD	AFRICAN UNION DEVELOPMENT AGENCY-NEPAD
AHRI	ARMURE HANSEN RESEARCH INSTITUTE
COE	CENTERS OF EXCELLENCE
COS	CENTERS OF SPECIALIZATION
ESTI	EDUCATION, SCIENCE, TECHNOLOGY, AND INNOVATION
FTE	FULL-TIME EQUIVALENT
GC	GLOBAL GRAND CHALLENGES
GCM	GRAND CHALLENGES MALAWI
GDP	GROSS DOMESTIC PRODUCT
GERD	GROSS EXPENDITURE ON RESEARCH AND DEVELOPMENT
IPD	INSTITUT PASTEUR DE DAKAR
MEAL	MONITORING, EVALUATION, ACCOUNTABILITY AND LEARNING
MIP	MALAWI IMPLEMENTATION PLAN
NEPAD	NEW PARTNERSHIP FOR AFRICA'S DEVELOPMENT
NCST	NATIONAL COMMISSION FOR SCIENCE AND TECHNOLOGY
NRA	NATIONAL RESEARCH AGENDA
SAMRC	SOUTH AFRICA MEDICAL RESEARCH COUNCIL
SDGS	SUSTAINABLE DEVELOPMENT GOALS
SFA	SCIENCE FOR AFRICA FOUNDATION
SGCI	SCIENCE GRANTING COUNCIL INITIATIVE
STI	SCIENCE, TECHNOLOGY AND INNOVATION
STISA	SCIENCE, TECHNOLOGY, AND INNOVATION STRATEGY FOR AFRICA

1. INTRODUCTION

Collaborating with key partners, the National Commission for Science and Technology (NCST) is working towards boosting domestic investments in research and innovations with the most significant impact, while promoting collaboration amongst researchers and innovators. This collaboration seeks to address fundamental national and global socioeconomic development concerns; particularly those that tackle urgent social, economic and humanitarian needs. The partnership will be carried out under the initiative titled “Grand Challenges Malawi (GCM)”. This initiative promotes Pan-African and international research and innovation cooperation in order to boost research quality and scaling up of innovations by improving domestic Research and Development (R&D) funding in Malawi. The strategy outlines NCST's mandate as the secretariat of GCM, as well as the funding mechanisms currently employed to support research and innovations. The strategy also provides information on the governance architecture, resource mobilization approaches, and the Monitoring, Evaluation, Accountability and Learning (MEAL) Framework that will be utilised for measuring the impact of GCM on Malawi's research and innovation ecosystem.

1.1 Background

Malawi aspires to establish itself as an internationally competitive leader in Science, Technology and Innovation (STI) by harnessing investments in research and innovation. This vision is based on the principle that knowledge and technological advancements are (i) key to tackling social-economic concerns (ii) a critical engine of economic growth, and (iii) ultimately indispensable in establishing a high standard of living for its citizens. This aspiration is further articulated in the Malawi Implementation Plan 2021-2030 (MIP-1) pp:2 as follows: "Malawians aspire to have a vibrant knowledge-based economy with a strong and competitive manufacturing industry driven by productive and commercially vibrant agriculture and mining sectors." MIP-1 provides the First 10-year Implementation Plan to guide in the execution of Malawi’s development blueprint, known as Malawi 2063, which was launched by the Government of Malawi in 2021. MIP-1 pursues the following two key milestones: (i) graduate Malawi to a lower-middle income country; and (ii) meet most of the Sustainable Development Goals (SDGs) by 2030.

1.2 Importance of research and innovation for national development

The field of STI is universally recognized as crucial to attaining sustainable development and driving economic growth. It provides a fundamental foundation for real economic growth and change, raising the standard of living and increasing the nation's wealth.

To guide the implementation of national development plans, the Government of Malawi adopted MIP-1 for the period during which the world is operationalizing Sustainable Development Goals (SDGs). MIP-1 serves as a medium-term national development plan for the next 10 years (from 2021 to 2030), which encompasses the closing stages of the Science, Technology, and Innovation Strategy for Africa (STISA 2024) and SDGs 2030.

1.3 Targeted Research and Innovation for Malawi Transformation: National Research Agenda

Malawi developed its National Research Agenda (NRA), which was launched in 2023. The NRA, which spans from 2023 to 2030, outlines strategic research priorities, technologies, and innovations which the country needs to spearhead development progress towards meeting MIP-1 milestones. The development of the NRA exemplifies the government's unwavering commitment to fostering a knowledge-based economy, which is crucial for achieving MIP-1 milestones and MW2063 aspirations.

The NRA aims to guide researchers, academic institutions, think-tanks, Centers of Excellence (CoE), and Centers of Specialization (CoS), along with local and international stakeholders in research and development, to generate knowledge, technologies, and innovations that foster a knowledge-based economy in Malawi. This pursuit aims for inclusive wealth creation and self-reliance.

The specific objectives of the NRA are to:

- Prioritize broad-based areas for research, science, technology, and innovation development;
- Facilitate multidisciplinary and multi-institutional coordination and collaboration in research, innovation, and technology programs;
- Increase the adoption of research outputs, innovations, and technologies in Malawi's development space; and
- Propel effective resource mobilization for research, technology, and innovation development.

To realize medium and long-term development prospects, the Malawi Government has integrated and mainstreamed STI into national development plans. This approach involves the prioritisation of knowledge, tools, scientific research, and technological innovation to address societal challenges and explore opportunities. The ultimate goal is to establish a globally competitive knowledge-based economy.

To leverage existing investments, NCST has embarked on promoting STI outputs that align with government policies by establishing innovative financing initiatives such as Grand Challenges Malawi. The focus will be on scaling these innovations, maximizing their potential, and positively impacting the well-being of Malawian citizens.

By implementing the National Research Agenda in a collaborative and focused manner, Malawi aims to accelerate its journey towards fostering inclusive growth and self-sufficiency. Through strategic collaboration and resource mobilization, the country is poised to achieve its development aspirations while addressing societal challenges and embracing emerging opportunities.

1.4 Landscape of research and innovation in Malawi

The Malawi national research landscape is currently being guided by the National Science and Technology Policy and the national development plan known as 2063 First 10-Year Malawi Implementation Plan – 2021-2030 (MIP-1). Recently Malawi, launched a National Research Agenda to coordinate research in operationalizing the MIP-1. In this development plan, Malawi aspires to attain a lower middle income status by 2030. MIP-1 has set a new target of gross expenditure on research and development (GERD) to 2% of gross domestic product (GDP) by 2030 if Malawi is to transform into an industrialized exporting economy. The Malawi National Research and Development survey (2019) revealed that the intensity of research has declined at the national level as GERD is estimated at 0.17% of GDP in 2019. There could be many explanations for this decline but among the main challenges is the fact that there is low investment into research and development evidenced by the total expenditure on research estimated at nearly MK14 billion, much lower than the estimated expenditure in 2010 (Table 1). Malawi has a low headcount of research and development personnel per million inhabitants. In 2010, the total R&D personnel was 194 and in 2019 the number had declined to 157 per million population. These are mostly in both private and public universities and research centres, which are 34 in total depending on accreditation. Most academic institutions and research centres lack the requisite modern research infrastructure which researchers can utilise to undertake R&D activities.

Shares of R&D expenditure reveals that the R&D system is mostly dominated by higher education at 49.8% and the bulk of research financing in higher education institutions comes from external financiers. The share of Government institutions' expenditure in R&D follows higher education at 27.1%. The data shows that Not for Profit institutions share is approximately 18.4% followed by the Business Sector's share at 4.7%.

Table 1: Landscape of research and innovation in Malawi

Indicator	2010	2019
Population (000,000)	14.846	19.89*
Gross Domestic Product (000,000) (market prices)	1,033,194	5,970,090
Gross Domestic Expenditure on Research and Development (GERD)	-	14,
Gross Expenditure on Research and Development as a % of GDP	1.1%	0.17%
Higher Education expenditure on Research and Development (share of GERD)	32%	49.8%
Government expenditure on Research and Development (share of GERD)	19%	27.1%
Private Not for Profit (share of GERD)	26%	18.4%
Business Expenditure on Research and Development (share of GERD)	23%	4.7%
R&D Personnel (Headcount) per million population	194	157
Researchers (Headcount) per million population	49	70
R&D Personnel (FTE) per million population	110	103
Researchers (FTE) per million population	27	26
Public Universities	2	6
Private Universities	3	28
Global Innovation Index (GII)	-	107
Internet Users (In million)	-	5.04
Human Development Index	-	0.514

SOURCE: NSO, RBM, NCST (2022)

To ensure systematic data collection process (which will fully provide a new landscape of financing research and innovation activities in Malawi), the GCM has been linked to the National Research Agenda which has a monitoring, evaluation, accountability and learning framework that has been developed to ensure timely reporting and data collection from the reporting units.

2. MALAWI NATIONAL COMMISSION FOR SCIENCE AND TECHNOLOGY

2.1 The Mandate

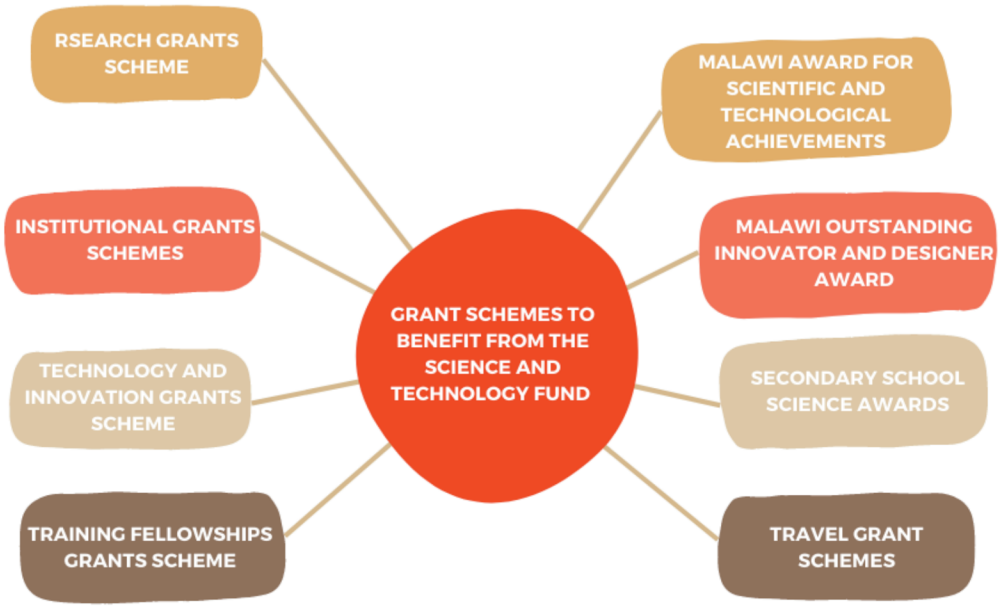
Established through the Science and Technology Act of 2003, the mandate of the Malawi National Commission for Science and Technology (NCST) is to advise the Government and other stakeholders on all science, technology and innovation matters in order to achieve a science and technology led development. Thus, the mission of NCST is to promote, support, coordinate and regulate the development, application, and dissemination of science, technology and innovation in order to create wealth and improve the quality of life of Malawians. The NCST serves as the central body responsible for coordinating and overseeing all scientific, technological and innovation-related activities in the country.

The selected specific functions and responsibilities of the NCST in relation to GCM entail the following:

- Create science, technology and innovation awareness at the political and other levels of society and thereby obtain their commitment towards the value of science, technology and innovation as integral parts of national development strategies;
- Establish mechanisms to solicit support from the executive and legislative branches of Government, policymakers and the private sector in-order to promote the formulation and revision of policies, strategies, laws and regulations for science, technology and innovation, and the monitoring of the implementation of science, technology and innovation development activities;
- Source funding from within and outside Malawi to finance the national research and development efforts and allocate the funds to research institutions based on set priorities;
- Chart out national direction and establish national priorities in science, technology and innovation development in relation to socio-economic development needs; and
- Appraise, review, monitor and evaluate priority research and development programmes, plans and projects of research and development institutions and undertake independently or in collaboration with any appropriate person, body or institution surveys and research investigations considered necessary.

2.2 Current Funding mechanisms to strengthen research and innovation capacity

The Science and Technology Fund, abbreviated as S&T Fund, supports programmes, projects and activities towards the advancement of STI in Malawi, consistent with Section 28 of the Science and Technology Act as spelled out in 1.2.2 above. The types of grant schemes to benefit from the Science and Technology Fund include, but are not limited to the following:



Just like the Science Granting Council Initiative (SGCI), the Grand Challenges Malawi will buttress efforts linked to Grant Schemes (1), (2) and (3) as the National Commission for Science and Technology has mainly been financing small grants (with a limit of $5,000 per project) whose impact has been very limited.

3. GRAND CHALLENGES

The Global Grand Challenges (GC) initiative engages global innovators in addressing STI, health, and development challenges. Grand Challenges aims to foster innovation, by directing research funding and support resources to areas with the most significant impact while promoting collaborations amongst researchers and innovators from diverse organisations, such as for-profit institutions, non-governmental organisations, academic and research institutions, foundations, and civil society groups.

In 2003, the Bill & Melinda Gates Foundation launched its first initiative, Grand Challenges in Global Health, to engage the most creative minds worldwide in research breakthroughs. The Grand Challenges model has proven highly adaptable to various contexts and partners with stakeholders using it to fund, foster, and support innovation to address critical global health and development issues over the last decade.

In 2015, AUDA-NEPAD and Alliance for Accelerating Excellence in Science in Africa (AESA) launched Grand Challenges Africa programme. The goal was to scope the landscape for innovations that address continental development challenges, provide follow-on funding, support the translation and scaling of promising innovation concepts, and expand the Grand Challenges Network. Currently hosted by Science for Africa Foundation (SFA), the programme focuses on African Challenges as directed by Science, Technology, and Innovation Strategy for Africa (STISA) 2024.

Country Grand Challenges in Africa

Following the establishment of Grand Challenges Africa, the formation of National Grand Challenges was spurred by the need to domesticate the global and continental model and ensure that funding for research and innovation in African countries was directed toward addressing the unique challenges faced by African countries. Furthermore, this mechanism is aimed at enhancing national ownership for financing the STI agenda as expressed in national development plans. The existing portfolio of Grand Challenges Chapters has collectively invested over US$ 180 million in 600 innovative African projects to address Africa's critical development issues. However, while the funding has intended to address Africa's developmental challenges, there is consensus that National Grand Challenges are better positioned to identify, leverage and harness innovations that address national development priorities through the scaling up of home-grown solutions.

Why Country Grand Challenges - Focus on National Priorities

In 2019, AUDA-NEPAD and Alliance for Accelerating Excellence in Science in Africa (AESA) commenced work on the scientific priority setting for African R&D with the aim of defining the agenda for investments in R&D on the continent. Findings from the scientific priority exercise were presented to the African Ministers of Education, Science, Technology, and Innovation (ESTI), who called for the establishment of R&D platforms at national, regional and continental levels to support investments in R&D. Country Grand Challenges is one of the platforms African countries are utilising to accelerate investments in R&D on the continent.

The National Grand Challenges initiatives prioritise challenges that are relevant to the local context, addressing issues that impact the lives of citizens directly. This ensures that resources and efforts are targeted towards solving key development issues that matter most to the population.

Access to Funding

Through the National Grand Challenges model, Member States can ensure the sustainability of R&D and innovation due to access to funding.

(i) Matched Funding

Political will is key to the sustainability of the National Grand Challenges. External funders commit matched funding on a 50:50 basis or more to funds mobilized domestically. This is usually at the inception of the programme to enable its kick-off. For example, funders have committed to match funding raised by the Government of Malawi to launch Grand Challenges Malawi. This matched funding model enhances the commitment of domestic resourcing to drive Science, Technology and Innovation (STI) initiatives within countries and supports the transition toward domestically sustained innovations that are guided by the national priorities.

(ii) Access to Additional Funding

By virtue of being a member of the Grand Challenges family, a National Grand Challenges is introduced and has access to various streams of funding sources from development partners that share aligned goals and ambitions. As the programme continues to scale up, it is possible to have calls for proposals fully funded by development partners. For example, immediately after its initial formation, Grand Challenges Senegal benefited from external funding to run a call on “interventions to enhance epidemic intelligence, surveillance, and outbreak response.”

(iii) Collaboration and Partnerships

The Grand Challenges initiative encourages collaboration and partnerships amongst governments, academia, industry, and civil society. Multi-stakeholder engagement facilitates knowledge exchange, resource sharing, and the pooling of expertise to achieve impactful solutions.

The Grand Challenges Family often collaborates on joint calls for proposals. This close collaboration allows sharing of best practices amongst the various Grand Challenges programmes globally, and lessons learned are consolidated in the annual learning and evaluation meeting. The Grand Challenges Annual Meeting helps to connect the family and is instrumental in fundraising and establishing other partnerships.

(iv) Contractual Engagements

The International Grand Challenges (GC Exploration & GC Canada) continue to fund projects in Africa directly, and in many instances, they require local support in executing and monitoring the projects. For example, GC Canada contracted GC Africa to offer technical support to scale up GC Canada-funded innovations in Kenya. These contracts enhance the sustainability of local Grand Challenges while utilising home-grown solutions to support development in Member States.

(v) Entrepreneurship and Startups

Grand Challenges seeks to support the research and innovation value chain from ideation up to transition to scale. Country Grand Challenges can spark the growth of innovative startups and entrepreneurial ventures through incentivisation of innovators to develop solutions, thus leading to the creation of new businesses, boosting economic activity and job creation.

Currently, there are five established National Grand Challenges in Africa, namely Grand Challenges South Africa (hosted by South Africa Medical Research Council – SAMRC), Grand Challenges Ethiopia (hosted by Armure Hansen Research Institute – AHRI), Grand Challenges Botswana (hosted by Botswana Innovation Hub), Grand Challenges Senegal (hosted by Institut Pasteur de Dakar (IPD) foundation), and Grand Challenges Rwanda (hosted by National Council for Science and Technology).

3.1 Grand Challenges Malawi

In an effort to address imperative health and development matters within the country, the Malawi Grand Challenges initiative provides considerable financial aid and resources to endorse groundbreaking resolutions. The establishment of the GCM not only allows Malawi to broaden resource streams for research and innovation but also provides them with an opportunity to utilize a platform that connects experts, researchers, and innovators from diverse fields and regions. By leveraging this mechanism, Malawi can harness expertise to create and execute technologically advanced solutions that align with the local context. This will serve as a significant catalyst for research and innovation in the country.

Addressing Local Challenges

Various National Grand Challenges Chapters focus on issues that are particularly relevant to the respective African country, such as enhancing healthcare accessibility, combatting infectious diseases, boosting agricultural productivity, and ensuring access to clean water and sanitation. Through implementing this program model, Malawi can tap into resources that are tailor-made for resolving their distinct challenges.

The Grand Challenges program promotes collaboration among governments, academia, non-governmental organizations, and the private sector. This initiative enables the GCM to form partnerships with these stakeholders, facilitating knowledge sharing and collective endeavours in addressing intricate issues. Utilising the capacity-building aspects of the grand challenges network can enhance local institutions, and research capabilities, and strengthen innovation ecosystems in Malawi. This will contribute to achieving sustainable development in the long term for the country.

Global Visibility

Being part of the Grand Challenges network provides visibility on a global stage. By showcasing Malawi's initiatives to utilize research that fosters development, GCM can potentially attract additional investments and facilitate cross-national collaborations.

Accelerating Developmental Progress

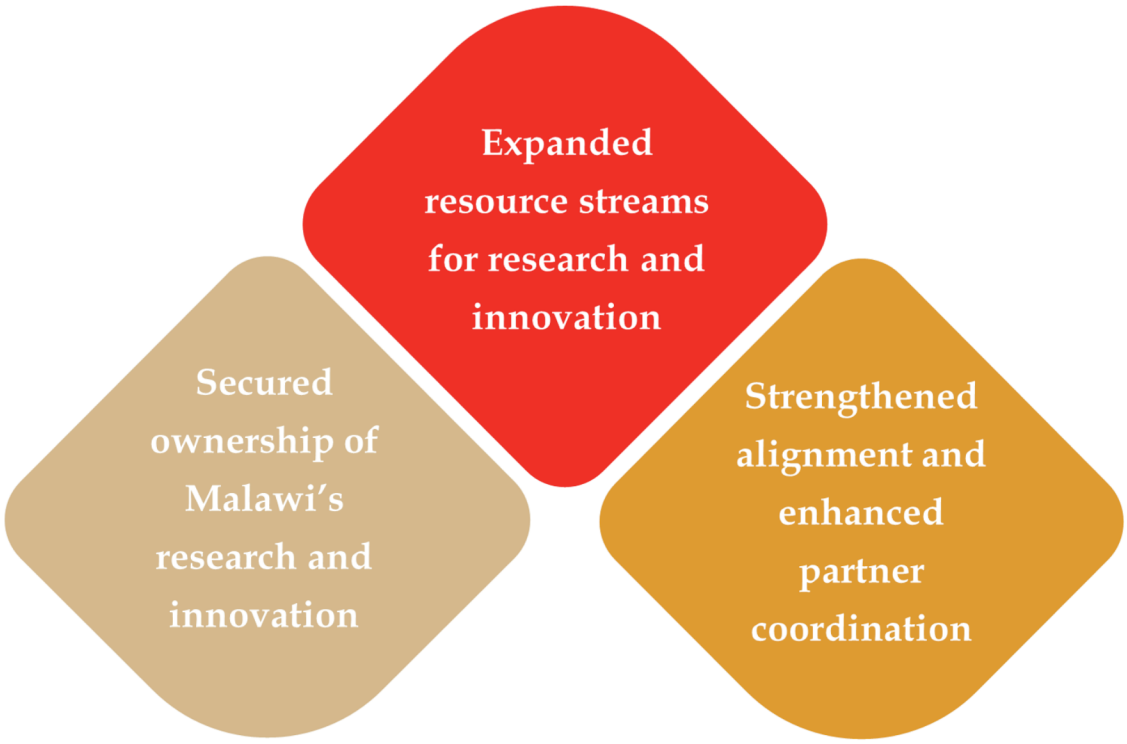
The Grand Challenges model emphasizes rapid innovation and results-driven approaches. Malawi aims to leverage this model to accelerate the development and deployment of solutions, leading to quicker improvements in critical sectors such as health, agriculture, and education. Furthermore, the GC program promotes a culture of learning and knowledge sharing, with GCM recognizing the value of drawing from the experiences and insights of other participants. By doing so, they aim to benefit from the experiences and lessons learned by other participants, avoiding potential pitfalls and adopting best practices.

Promoting Innovation

This program aims to stimulate innovative thinking and solutions, thus fueling local entrepreneurship and contributing to economic development. GCM can additionally cultivate an atmosphere of innovation and creativity that aligns with the NCST's mission.

3.2 GCM Value Proposition

Grand Challenges Malawi's distinguishing value-addition is derived from the following value proposition:



3.3 Priority Areas

Guided by the MIP-1 and the National Research Agenda, Grand Challenges Malawi identified four priority areas to inform this strategy. Grand Challenges Malawi will award grants in the chosen priority areas to foster the development of quality and cutting-edge research and innovations in alignment with the development priorities of Malawi.

The priority areas that will inform the grant calls over the next five-year period are outlined in the table below:

Table 2: GCM Priority Areas for 2023 - 2028

SELECTED GRAND CHALLENGE AS PER NRA	THEMATIC/PRIORITY AREAS	DESCRIPTION OF THE SELECTED RESEARCH & INNOVATION PRIORITY FOR GC MALAWI
Health, humanitarian, and climate change nexus	Enhancing health system preparedness and responsiveness.	The Grand Challenge will support research and innovation to build resilient health systems that can cope with any shock related to humanitarian and climate crises. The ability of these facilities to surge capacity will help them to respond to sudden increases in demand for services. The Grand Challenge will support research and innovation into climate change and resilient environment studies that mitigate infectious and non-infectious diseases.
	Disease surveillance intelligence, data modelling, Artificial Intelligence (AI) and its applications	The Grand Challenge will enhance the detection and forecasting capabilities of disease outbreaks and epidemics, and the monitoring of interventions.
	Healthcare and Telemedicine	The Grand Challenge will ensure that Fourth Industrial Revolution (4IR) are harnessed to develop innovations for healthcare delivery, especially in remote areas. Electronic health records and AI-driven diagnostics, treatment, patient engagement and adherence applications can increase access to quality healthcare services and address health disparities
Health and well being	Maternal, newborn, child and adolescent health	The Grand Challenge will support a life course approach to investment in health research to tackle key maternal, newborn, child and adolescent health problems and fulfil their human development potential.
	Disease prevention, diagnosis & treatment.	The Grand Challenge will promote vaccine development, innovations in diagnostics capabilities, and drug discoveries for communicable and non-communicable diseases, and neglected tropical diseases (NTDs)
	Trauma and Emergency Medical services	The Grand Challenge will support research and innovations that will address the prevention, diagnostics, and management of Trauma and Emergency Medical Services.
	Nutrition and dietary diversity	The Grand Challenge will support research and innovation that will address the key determinants of malnutrition (biological, morbidity, social, economic factors) including developing local diagnostic and treatment solutions.
	Mental Health	The Grand Challenge will support innovations for addressing common mental health problems
Energy Generation and supply	Transition into renewables energy systems	The Grand Challenge will support efforts for Malawi to transit into renewable energy (RE) systems. This will involves developing local manufacturing of renewable energy materials, Development of new energy sources e.g., battery assembling, mini-hydro power systems, solar components manufacturing and electric vehicle solutions.
	Diversification of energy production	The Grand Challenge will reduce overreliance on biomass energy sources and fossil fuels. Transitioning from biomass energy systems requires more focus on alternative energy sources where Malawi has comparative advantages in production and trade in services

Agricultural productivity and commercialization	Energy infrastructure financing models.	The Grand Challenge will address challenges in energy infrastructure development. The high cost of financing energy infrastructure as a grand challenge will require collaborative support. The energy infrastructure requires public-private partnerships models if the transition into more efficient energy systems is to be attained
	Local manufacturing of energy materials	The Grand Challenge will support Malawi to start manufacturing of renewable energy components in the medium to long term.
	Energy efficiency and conservation	This challenge will focus on the transition to electric vehicle (EV) systems will require more research into energy-efficient solutions and conservation of energy
	Sustainable energy systems	The Grand Challenge will aim at improving the efficiency of energy systems and development of sustainable, low-carbon-emission energy generation processes, which is essential for the long-term health of the environment
	4IR for energy systems development	The Grand Challenge will focus on the contribution of 4IR to attain Energy 4.0. Issues will include Hyperphysical systems, the Internet of Things and networks, among others.
	Agriculture productivity, processing, nutrition, and commercialization	The Grand Challenge will address innovations for processing and productivity improvement and value addition. Promotion of models for agricultural commercialisation
	Agriculture diversification	The Grand Challenges will focus on value chains, fish development, aquaculture, livestock nutrition.
	Agriculture and Climate Change	This Grand Challenge will focus on the interaction between agriculture and climate change. With a focus on adaptation and resilience of agriculture in Malawi
	Irrigation development	The Grand Challenge will, among others, focus on Crop specific irrigation systems, financing models, water harvesting technologies
	Agriculture inputs	The Grand Challenge will focus on fertilisation – formulations for both organic and inorganic with area specificity, development of new seed varieties, application of Biotechnology in seed systems
	Agriculture mechanization	The Grand Challenge will support Innovations in agricultural equipment and commercialisation, Sustainable agricultural mechanisation (enablers, technologies, etc.)
	Structured markets	The Grand Challenge will support establishment of Structured markets and operations, Economies of scale for high value commodities, e-agriculture marketing and e-commerce, competitiveness. of high-value crops
	4IR technologies for Smart Agriculture and Food Security	The Grand Challenge will support 4IR technologies that will revolutionize the agricultural sector and enhance food security in Malawi. Research should explore how to leverage IoT, precision farming, and data analytics to optimize agricultural practices, improve yields, and reduce post-harvest losses.

4. GRAND CHALLENGES MALAWI STRATEGIC FRAMEWORK

4.1 Vision, Mission, Values, and Strategic Objectives

VISION

Excellence in research and innovation for home-grown solutions to address the national development agenda

MISSION

Promote research and innovation that improves the quality of lives of Malawians and Africans through local and international collaboration

GOAL

To improve the livelihood and health status of the Malawi population

Values

Excellence

GCM shall adhere to the highest standards of scientific performance in terms of quality services. "Best science. Best research. Best innovation philosophy". Upholding professionalism in all spheres of work

Transparency and Accountability

GCM shall aim at ensuring the responsible use of available resources to achieve the intended outcomes and impact

Efficiency and Effectiveness

GCM shall ensure prudence in the use of resources to obtain optimal value for money

Responsiveness

GCM shall be responsive to the local community challenges

Integrity

GCM shall ensure that research follows ethical and legal principles

Gender, Equity, Social Inclusion (GESI)

GCM shall ensure that all people are given equal opportunities through respect, fairness (equity) and dignity, and shall advance gender equality

Strategic Objectives

01

To strengthen the national innovation ecosystem and build the capacity and capability of local researchers/ innovators and R&D infrastructure

02

To leverage resources and expertise from public, private and development partners for effective and efficient execution of priority areas of research and innovations

03

To optimise financing of the value chain of research and innovation from ideation, discovery, development, delivery and transition to scale

4.2 Theory of Change

Grand Challenges Malawi strives to realise its vision of excellence in research and innovation for homegrown solutions through advancement of high-end manufacturing and commercialization of products and services to address national priorities as a driver for improved livelihood, health and human capital. This requires a systematic approach that addresses the various determinants, including political will, sustainable funding and dedicated staff that drive the establishment of a system to identify and support research and innovation ideas, development of innovative technology to address national priorities, and sustained engagement with the private sector, development partners and other actors at national, regional and continental levels.

Figure 1: Grand Challenges Malawi Result Framework

5. GRAND CHALLENGES MALAWI - GOVERNANCE ARCHITECTURE

GCM initiative will be run by NCST with facilitation and implementation of projects by the GCM Secretariat hosted by the NCST. Programme personnel will also be hosted by NCST and will comprise employees of the NCST. The nature of this programme necessitates that the team leader for this programme has a direct reporting line to top leadership of the NCST and responsibilities to the Office of the Director General. The GCM Secretariat will comprise 6 Grants Officers, 1 Accountant and 1 Manager/Director prior to the time of the launch of GCM.

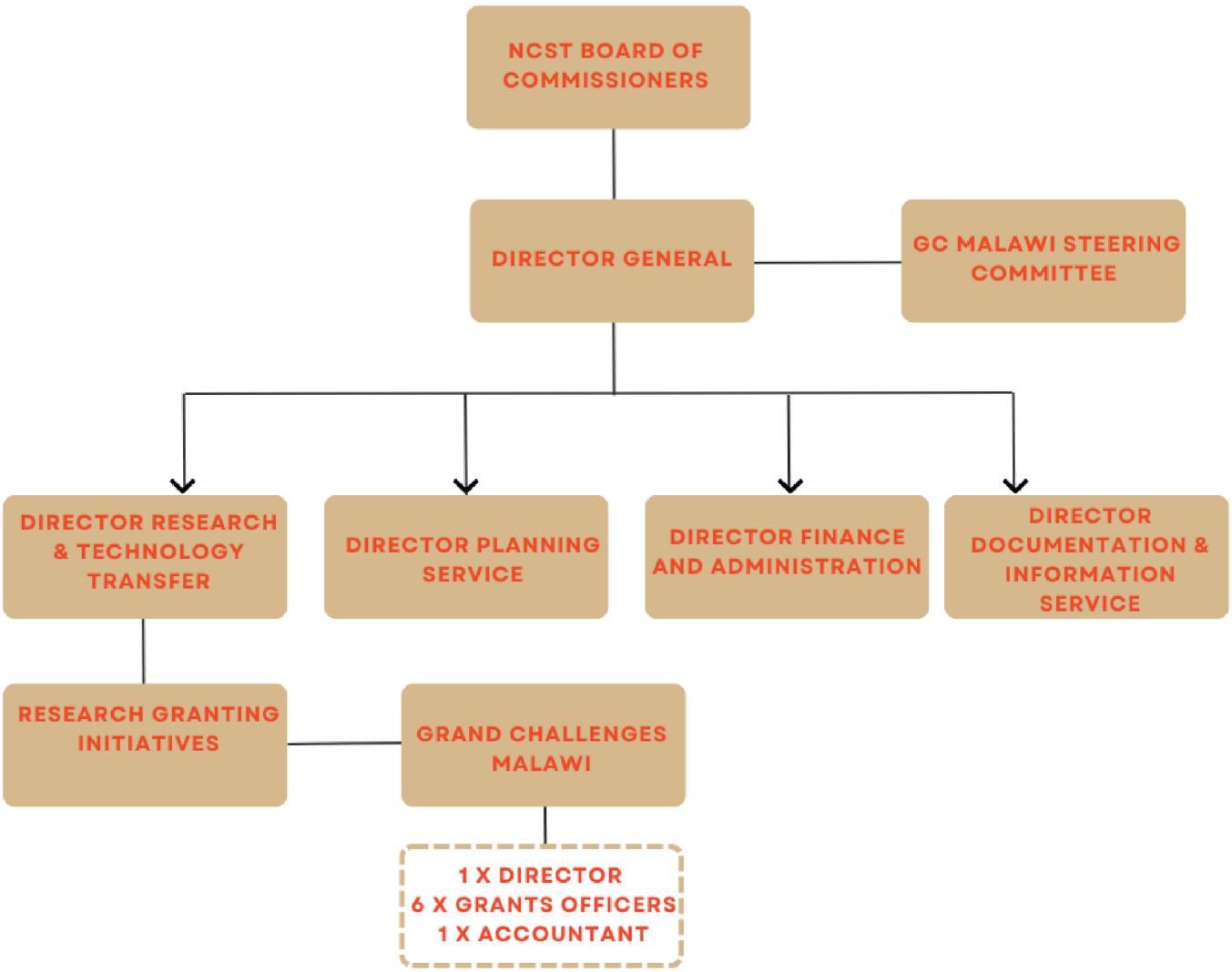


Figure 2: GCM Organogram and Governance Structure

5.1 Role of the Board in providing oversight

The Board of Commissioners for NCST will provide strategic oversight to GCM. To ensure accountability, the team leader of GCM will provide reports to NCST Board of Commissioners. Due to the high level of significance of GCM, the team leader of GCM shall be part of the NCST management team that will be attending board meetings.

Steering Committee of GCM to provide guidance and oversight functions. Oversight for GC Malawi will be provided by NCST Secretariat. There will be representation of NCST, The SFA and participating partners in this committee. Advisory experts with no voting rights will be invited to attend and advise on matters where the Governance committee has no deep expertise. The governance committee will be invited to provide their oversight through various meetings considering the following:

- Review of Grand Challenges Malawi Strategy
- Annual technical plans and budgets for the coming year
- Review of the technical report and actual spending for the previous year(s)
- Participation in final funding decisions after the formal review process of the calls for proposals
- Proposal and review of governance and oversight charter for the Grand Challenges Malawi in line with this Strategy

The NCST Malawi and SFA will set up a Decision Committee which will consist of a pool of independent external reviewers, with broad or specific expertise, who are experienced and willing to spend time reviewing. The Decision Committee shall have full power and authority to consider and approve or reject applications for all types of schemes.

5.2 Partnerships and Resource Mobilization

The commitment from the Government of Malawi in this case, has been the creation of a Grand Challenges Malawi Initiative that would co-fund these activities. This will serve as a gateway for Malawi to participate in many Grand Challenge activities, partnerships and public goods. It is important to note that there are a range of Grand Challenge program structures that could be tailored to suit Malawi's interests in global challenges such as health and manufacturing and related development. Being a Global player, SFA supports collaborative initiatives that espouse ground-breaking ways of building the innovation ecosystem.

For example, the Accelerator Discussion Paper 5, titled 'Research and Development (R&D), Innovation and Access' developed by the Wellcome Trust and WHO with contributions from the WHO Advisory Committee, Unitaid, UNAIDS and UNDP offers some common lessons for the process of scaling across best practices from identified innovations. These principles are important for the development of the GCM initiative and are supported by the SFA.

These include:

- The value of coordinated partnerships and coherent policy and regulatory frameworks, for example, between local implementers, government, funders, researchers and recipient communities
- The effectiveness of end-to-end programmes, that develop or adapt innovation to suit the context and take on implementation and access considerations in the early stages of R&D and use this knowledge to carry out the implementation with appropriate partners
- The importance of involving the broad range of actors in the design, planning, adaptation, implementation and scale-up of innovation, supporting existing or creating new platforms that allow for the development and implementation of multi-sectoral and coherent national government priorities
- The importance of locally-driven and locally-owned needs-assessment and demand for innovation

5.3 Potential resource streams

Potential funding streams to explore when developing and implementing the GCM resource mobilisation strategy include the following:

- **Government Funding:** To foster ownership of the Research and Innovation Agenda, the government of Malawi, through the treasury, is expected to continue the exploration and provision of funding opportunities for research and projects focused on solving national grand challenges.
- **Foundations and Philanthropic Organizations:** identification and engagement of foundations and philanthropic organizations that are dedicated to addressing global issues in alignment with Malawi's national priorities. These can include well-known organizations like the Bill and Melinda Gates Foundation, the Rockefeller Foundation, Wellcome Trust, Dangote Foundation and many others. These foundations can provide grants and investments to support initiatives that align with their mission.

- **Corporate Sponsorship and Partnerships:** Corporations with an interest in the specific challenges in the priority areas (identified in Table 2) being addressed might provide financial support, resources, or expertise through sponsorship or partnership arrangements. They may see value in aligning their corporate social responsibility efforts with initiatives that have a positive impact on society.

- **Venture Capital and Impact Investing:** Although there are limited venture capital firms in Africa's innovation landscape, Global venture capitalists and impact investors are constantly seeking to fund innovations and initiatives that have the potential for both significant societal impact and financial returns. This approach is particularly common in sectors such as clean energy, healthcare innovation, and sustainable agriculture which are also some of the priority areas of this strategy.

- **International Organizations:** International organizations such as the United Nations, World Bank, and regional development banks may have funding programs aimed at addressing global challenges, especially those related to development, poverty reduction, and sustainability.

- **Crowdfunding and Public Engagement:** An increasingly expanding resource stream, crowdfunding platforms can be used to raise funds directly from the public, engaging a broad range of people who are passionate about solving the challenge. This approach also helps raise awareness and build a community around the initiative.

- **Research Grants and Academic Institutions:** Universities and research institutions often have grant programs that fund research projects aligned with specific themes. These institutions can also contribute in-kind support, such as expertise, facilities, and equipment.

- **Non-Governmental Organizations (NGOs):** NGOs focused on relevant areas may have funding programs to support initiatives that align with their mission. They might also collaborate to pool resources and expertise.

- **Public-Private Partnerships:** Collaborative efforts between the NCST, private companies, and non-profit organizations can leverage the strengths of each sector to tackle complex challenges. This can result in combined funding from various sources.

- **Competitions and Prizes:** Offering cash prizes, grants, or recognition for achieving specific milestones or solutions can attract innovators and researchers to contribute their expertise to the Grand Challenges program.

- **Impact Grants from Financial Institutions:** Some financial institutions offer impact grants to fund projects that address social or environmental challenges, as part of their commitment to responsible banking.

Multilateral Development Banks: These institutions provide funding for development projects in various sectors, including those aimed at addressing global challenges in developing countries.

When seeking funding for GCM it's essential to create a comprehensive funding strategy that considers multiple sources, builds strong partnerships, and communicates a clear and compelling vision for addressing the five-year priority areas. Diversifying funding sources can also provide stability and sustainability for the program over the long term.

6. MONITORING, EVALUATION, ACCOUNTABILITY AND LEARNING

The success of the Grand Challenges Malawi initiative is highly dependent on a robust monitoring and evaluation (M&E) system. M&E will serve as a strategic tool for tracking progress, measuring impact, and ensuring accountability during the implementation of GCM. Continuous assessment of progress against expected results will be undertaken through the utilisation of different M&E mechanisms as a guide to assess the level of impact of GCM against programme activities and ensure alignment to the objectives of the initiative. The strategy highlights the various M&E mechanisms that will be utilised to monitor progress.

6.1 Monitoring, Evaluation, Accountability and Learning Mechanisms

The following mechanisms will be used throughout the life cycle of the GCM to review, reflect and learn about progress, challenges and opportunities:

Key Performance Indicators (KPIs): Defining specific and measurable indicators that reflect the desired outcomes and impacts of the initiative. Regular tracking of KPIs helps gauge progress toward objectives.

Data Management Systems: Implementing digital platforms or software to centralize and manage M&E data efficiently. These systems can facilitate data entry, storage, analysis, and reporting.

Regular Reporting: Implementing scheduled reporting cycles to provide updates on activities, outputs, and outcomes. Reports often include quantitative and qualitative data, as well as narrative descriptions of achievements and challenges

Data Analysis and Visualization through the Grant Management System: Employing statistical analysis tools and data visualization techniques to interpret collected data and present findings in a clear and meaningful manner. Creating visual dashboards that provide real-time updates on key indicators, enabling stakeholders to monitor progress and trends at a glance

Site Visits and Field Observations: Conducting on-site visits to project locations to directly observe activities, verify reported data, and assess implementation challenges.

Feedback Mechanisms: Establishing channels for stakeholders and beneficiaries to provide feedback, suggestions, and concerns related to the initiative. Feedback can inform decision-making and improve implementation.

External Evaluations: Engaging independent evaluators or evaluation teams to conduct objective assessments of the project's effectiveness, efficiency, relevance, and sustainability

Participatory M&E: Involving stakeholders and beneficiaries in the M&E process, allowing them to contribute their perspectives and insights. This promotes ownership, learning, and inclusivity

Lessons Learned Workshops: Organizing workshops or discussions to reflect on successes, challenges, and lessons learned from the M&E process. This contributes to adaptive management and continuous improvement.

6.2 Monitoring, Evaluation, Accountability and Learning Framework

Table 2 below summarises the result matrix of GC Malawi over a five-year period for each strategic objective. During the initial year of implementation baseline and target values for proposed indicators will be set for each operational year to track progress in outputs and outcomes.

Strategic Objective 1: To strengthen the national innovation ecosystem and build capacity and capability of local researchers/innovators and R&D infrastructure

Activities	Output	Output indicator	Outcome	Outcome indicator
Identify and prioritise national research and innovation agendas Establish a system to identify and support research and innovation ideas Undertake human capacity development needs assessment in R&D Conduct mentorship and exposure visits Organise trainings locally and abroad Conduct feasibility study and development of incubation centre for research and innovation	Novel research and innovation ideas identified and supported Increased number of researchers and innovators trained and mentored R&D incubation centre established	Number of novel ideas with proof-of-concept research and innovation identified and supported (by type) # of innovators mentored (by type of skill sets) # of innovators who benefited from exposure visits # of innovators trained (by type of training) Establishment of incubation centre	Innovation technology developed to address national priorities Improved research and innovation skill sets Functional R&D infrastructure to support innovation	Proportion of innovative ideas supported converted to products and services Proportion of innovative products and services transitioned to scale
Strategic Objective 2: To leverage resources and expertise from public, private and development partners for effective and efficient execution of priority areas of research and innovations				
Undertake landscape analysis of potential partners at local, regional, and continental levels in order to identify areas of collaboration	Landscape analysis of potential partners at local, regional and continental level done and areas of collaboration identified	Report on landscape analysis of potential partners at local, regional and continental level and areas of collaboration available	Sustainable engagement with private sector, development partners and other actors at national, regional and continental levels	Joint collaborative research and innovation projects

Activities	Output	Output indicator	Outcome	Outcome indicator
Strategic Objective 2: To leverage resources and expertise from public, private and development partners for effective and efficient execution of priority areas of research and innovations				
Develop partners engagement framework for local and international alliance building with private sector, development partners, research institutions and academia Develop and implement advocacy and communication strategy	Partners engagement framework developed Advocacy and communication strategy developed Advocacy and communication strategy developed	Availability of partners engagement framework and its implementation Availability of advocacy and communication strategy and its implementation		
Strategic Objective 3: To optimise financing of the value chain of research and innovation from ideation, discovery, development, delivery to scaling				
Conduct funding needs assessment Develop resource mobilization strategy Run funding calls for innovations and sign MoU and agreements for funding	Funding needs assessment conducted Resource mobilization strategy developed to finance calls and operations	Availability of funding needs assessment report and its implementation Availability of resource mobilization strategy and its implementation # of calls funded (by type)	Sustainable and diversified financing for R&D and innovation	Proportion of innovation ideas funded (by value chain)

Table 3: Result Matrix

7. SUSTAINABILITY FOR GRAND CHALLENGES MALAWI

It is essential to affirm that a programme designed to support Research and Innovation needs to be sustained to benefit the future generations to come.

GC Malawi aspires to be a sustainable initiative which will be able to support internal operations and Innovation funding activities. The GCM will create synergies with other Grand Challenges, such as Transforming Higher Education Systems (THES), which are supporting change agents and system-level initiatives to address thirteen higher education grand challenges in Malawi. The change agents comprise the public and private universities.

Beyond this, GC Malawi expects to record growth in its work in the medium and long term. Sustainability will be achieved through the establishment of:

Ownership of GCM by Government

The Government will ensure that the GCM is sustainable by supporting the development of new systems that will enable the S&T Fund to create more revenue. The S&T Fund should be able to support more innovations that can be commercialized and create royalties for supporting more funding.

Treasury loans and grants

In situations where the S&T Fund is under-resourced, Treasury is expected to support the NCST with more funding through loans and commissioned grants by allocating necessary resources, such as financial assistance and human capital. By doing so, the Government aims to ensure that GC Malawi has the necessary tools and capabilities to thrive and expand its impact in both the medium and long term.

Public-Private Partnerships

Public-private partnerships provide a unique opportunity for sustainable development of GCM research initiatives as they combine the strengths of both sectors. The government of Malawi supported by the NCST brings regulatory authority, enabling policy environment, access to data and research, and a long-term vision for socio-economic development. On the other hand, the private sector offers expertise in technology development, financial resources, and entrepreneurial spirit. By joining forces, PPPs can pool the knowledge and resources of both stakeholders to create transformative solutions that drive sustainable progress.

Furthermore, public-private partnerships can help ensure the scalability and implementation of solutions developed through GCM. Governments have the capacity to enact policies that incentivize sustainable practices or create regulations that promote responsible business behaviour. Meanwhile, the private sector possesses the technical expertise and market influence necessary to bring innovative products or services to scale rapidly. Together, an enabling environment can be created for sustainable solutions and innovations to thrive over the long-term.

Partnership and Cooperation (Private sector, Development Partners, Charities and Foundations)

Partnership and cooperation among various stakeholders such as the private sector, development partners, charities, and foundations can significantly contribute to making the GCM program sustainable in the long term. Firstly, the involvement of the private sector brings in additional financial resources that can supplement government funding and ensure the continuity of the program. Private companies can provide grants or sponsorships to support specific research projects aligned with their business interests or corporate social responsibility objectives. This not only enhances financial sustainability but also fosters a collaborative environment where industry experts work closely with researchers to develop innovative solutions.

Furthermore, partnering with development partners, charities, and foundations can diversify the sources of funding for the national grand challenges research funding program. Development partners often have significant expertise in supporting research initiatives globally and possess extensive networks that can connect local researchers with international opportunities. Charities and foundations bring their specialized knowledge and experience in addressing societal challenges through research projects. By collaborating with these organizations, governments can tap into their resources, influence, and connections to secure sustained funding for critical research areas identified within the grand challenges program.

Creating partnerships and fostering cooperation between different sectors is undoubtedly a vital step for ensuring the long-term sustainability of a GCM. The private sector can bring additional financial resources while benefiting from innovation-driven collaborations. Development partners, charities, and foundations offer diverse funding sources along with valuable expertise in tackling complex societal issues through research. By leveraging these alliances effectively, GCM can establish a robust framework that supports continuous investment in groundbreaking research endeavours well into the future.

Other Mechanisms of Financing Grand Challenges Malawi

Access to financial instruments e.g., endowment funds, establishing unit trusts: This shall include the creation of endowment funds which shall require enabling policy environment as some Governments like Malawi, do not provide for such instruments in the Act of 2003. The new Policies and Acts need to incorporate new funding instruments.

Conclusion

The Grand Challenges Malawi expects to achieve sustainable growth in the medium and long term through various strategies. These include government ownership, collaboration with local communities and the private sector, diversification of funding sources, fostering mutually beneficial local, continental and global partnerships, and capacity building within the organization. By implementing these measures, GC Malawi aims to ensure that it can continue making a positive impact on the lives of vulnerable populations in Malawi for years to come.

The Government of Malawi adopted MIP-1 for the period during which the world is operationalizing Sustainable Development Goals (SDGs). MIP-1 provides the First 10-year Implementation Plan to guide in the execution of Malawi's development blueprint, known as Malawi 2063, which was launched by the Government of Malawi in 2021.

The National Commission for Science and Technology (NCST) was established in 2008 to provide Science and Technology advice to the Government and other stakeholders on all matters related to science and technology in order to achieve a science and technology-led development in Malawi.

The Grand Challenges initiative is a strategic approach to addressing critical global health and development issues affecting Member States through investing in Science Technology and Innovation (STI).

The African Union Development Agency - NEPAD (AUDA-NEPAD) was established in 2018 as part of the global reforms geared at improving the African Union's impact and operational efficiency.

The Science for Africa Foundation is a non-profit, pan-African organisation, that aims to support, strengthen and promote science and innovation in Africa.

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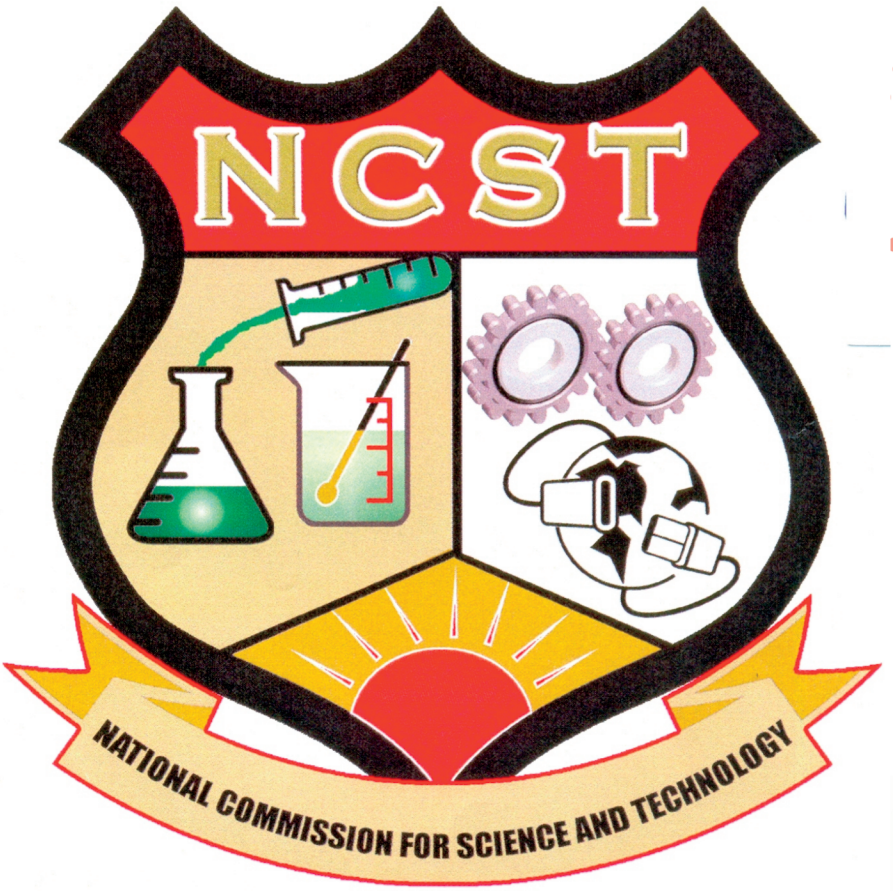
National commission for Science and Technology



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