

ANNUAL REPORT

2022/2023

Leading in the advancement of science, technology and innovation for sustainable economic growth and development of Malawi

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BOARD CHAIRPERSON STATEMENT, Prof Emmanuel Kaunda

The fiscal year of 2022/23 has been special to the National Commission for Science and Technology and the entire research and innovation ecosystem although not without challenges. The Commission has witnessed more potential for Science, Technology and Innovation (STI) and more capabilities to drive the development agenda of Malawi to attain the aspired lower middle income status by 2030. There are a number of outputs and outcomes reported herein which signify that opportunities are numerous for scientific research

community. I thank the Board of Commissioners for providing the right oversight and good governance to the Secretariat as without them most of these milestones could not have been attained.

A few outcomes are worth to mention and I hope these will excite Malawians, the academia and the research communities. The launch of the National Research Agenda in March 2023 as a flagship activity was accomplished; The launch and hosting of the Open Forum on Agricultural Biotechnology (OFAB) which is an advocacy project for the African Agricultural Technology Foundation (AATF); The collaboration of NCST and UNDP to establish the first ever Innovation PoD project (Unipod) and Technology Transfer Office at MUBAS; Orienting and sensitizing Members of the Parliamentary Committee on Education Science and Technology; Presidential Delivery Unit (PDU) facilitation of acquisition of land for the construction of the Multipurpose STI Infrastructure-The Board of Commissioners played a crucial role to help NCST secure land through the Ministry of Lands; Support for grassroots high impact renewable innovation grants; Support for institutional grants; Unlocking support AUDA-NEPAD on Grand Challenges Malawi Concept which will help Malawi to become a member of the Grand Challenges Global family.

These outcomes speak volumes about the impact of NCST in Research and Development and Innovation space. This means that more Malawians will be able to participate in research and innovation programmes due to the availability of S&T Fund which NCST uses to support its Grant Schemes including grassroots innovators. Another implication is that the issues that Universities have been facing will be a thing of the past as the Unipod project will solve the innovation chasm challenges and promote commercialization of research. Above all, the provision of land by Dowa district local assembly for the Innovation City project has given a chance to NCST to review its initial multipurpose science, technology and innovation infrastructure.

I have every hope that the Malawian research and innovation system will be promoted, supported and well-coordinated at a highly different level as enshrined in the Science and Technology Act No 10 of 2003. With increased research and innovation support from the

Government of Malawi, development partners will find it easy to reciprocate their funding as they be responding to commitments of the Government towards its own development priorities.

I wish you a more impactful fiscal year 2023/24 that is around the corner.



Acting Director General Statement, Mrs Gift A. Kadzamira

First and foremost, let me welcome you to the Annual Report of 2022-23 in which we would like to share with you some strides and work-in- progress.

Over the year 2022, the world at large continued to recover from Covid-19 and locally, we even faced more challenges as Cyclone Anna devastated some parts of Southern Malawi. However, we continue to remain resilient and strong as Department of Disaster Management Affairs and other MDAs worked hard to support the victims that were affected.

Such tragedies affect the Research and Innovation ecosystem indirectly, as policies tend to shift towards curbing such shocks. I am pleased that the National Commission for Science and Technology did register strides in some important areas of research and technology transfer.

As the Chairman, Professor Kaunda has mentioned, a number of achievements have indeed been registered and for that I thank the staff of NCST who stood by my side to be able to achieve the targets.

As we look into 2023/24, NCST will aim to address the following milestones among others:

- Reviewing the Strategic plan for NCST;
- Supporting the development process of a successor Malawi STI Policy 2023;
- Developing the STI 4 SDGs Roadmap;
- Supporting implementation of the National Research Agenda (2023) through Grants and capacity building initiatives;
- Develop a Risk Management Policy and also review and evaluate existing policies, guidelines, and also Conditions of Services;
- Finalising the Functional Review of NCST as currently the organization is operating with low human resource capacity.

Let me join the Chairperson to wish you a more impactful fiscal year 2023/24 that is coming ahead.

Know the Outgoing Board of Commissioners

Commissioner Dr Chinthu Batwell CHIZONDA



Commissioner Chinthu Chizonda is an Agriculturist specialized in Tropical Veterinary Medicine and is married with six (6) children and ten (10) grandchildren. His work experience before he became a Commissioner of NCST can be traced back to the time he started his work as a Field Officer in Livestock Research at Chitedze Research Station from 1973 to 1974, then on Study Leave until 1979. District Veterinary Officer for Rumphi and Nkhata Bay Districts from 1979 to 1982. Then he later worked as Divisional Veterinary Officer for Mzuzu ADD, 1982 – 1985, Divisional Veterinary Officer for Blantyre ADD, 1985 – 1986, Principal Veterinary Research Officer, Central Veterinary Laboratory from 1986 – 1987, Assistant Chief

Veterinary Officer, 1987 – 1992. After this he rose to the Managerial posts becoming Deputy Chief Veterinary Officer (Field Services) 1992 – 1995 and then a Director of Veterinary Services, 1995 – 1999. He later got appointed a Controller of Agricultural Services responsible for all institutions under the Ministry of Agriculture from 1999 – 2003 and then Principal Secretary in the Ministry of Water Development and Irrigation, 2003 – 2004 and retired.

He was appointed as a Commissioner at the Civil Service Commission for five (5) years but was renewed for another five (5) years, 2007 – 2017 and appointed as a Commissioner at the National Commission for Science and Technology from 2021 to date.

Commissioner Professor Elias Kaphesi



Commissioner Elias Kaphesi is Professor of Mathematics Education and Pro-Vice Chancellor of Pentecostal Life University since 20August, 2022.

He holds a PhD degree in Mathematics Education obtained from the University of Nottingham in 2002, M.Ed degree in Mathematics Education from the University of Malawi in 1988 and Bed degree (Science and Mathematics) from the University of Malawi in 1984.

His principal areas of specialization include mathematics education, curriculum development and evaluation and Educational Research and Evaluation. Other areas of specialization include designing, developing, implementing and evaluating INSET courses; and developing instructional materials.

Prior to joining the Pentecostal Life University in 2022, Prof Kaphesi's worked as a Senior Lecturer in Mathematics Education at The Polytechnic, a constituent college of the University of Malawi between 2009 and 2017. He was chairperson for a Committee on University Teaching and Learning (CUTL) for Polytechnic, served as deputy head of department, acting Deputy Dean of faculty of Applied Sciences and Coordinator for teaching practice in the department of Mathematics and statistics. secondary school classroom teaching, head teacher of Secondary school, curriculum specialist at Malawi Institute of Education and also teacher of mathematics in the colleges in the UK from 2001 to 2008. Prof Kaphesi has also been involved in the assessment of TEVET training programs since 1999 to 2010; monitoring of the implementation of MIITEP in primary schools in Chiradzulu District in 1995; evaluation of the implementation of the primary school curriculum in Mulanje (including Phalombe), Blantyre Rural and Mwanza (including Neno) between September –October 1994; He has also been involved in the survey on community perception of what constitutes quality education in Malawi in 1995; needs assessment for the secondary school curriculum in Mangochi; Development of a Ten Year Education Development Plan for CCAP Synod of Livingstonia, Mzuzu.

Prof Kaphesi has co-authored mathematics textbooks for primary and secondary schools in Malawi. He has published research articles for international journals, attended and made presentations at mathematics education conferences. He has published two books: "Teaching Mathematics in Secondary Schools" and "Research Methodology: a Guide to Research Students." Prof Kaphesi has and continues to teach and supervise postgraduate students at Masters and PhD degrees level in various programmes both for public and private universities. his current research interest is in unlocking the mystery of dyscalculia and neuromathematics.

Commissioner Frank Maele



Commissioner Frank Maele is a highly focused, selfmotivated and hard working individual who enjoys facing challenges and believes in provision of several possible solutions to problems and challenges. He is a self-accomplished ICT professional and successful entrepreneur with vast experience in managing groups of human, financial and many other resources. He is married to Evelyn and together have one daughter and three sons. Commissioner Maele has an excellent command of English and Chichewa languages. Easily creates and manages business and social relationships

Currently, he is a Group Managing Director of Compubyte, Byte Lodges, Bytes Foods, Bytes House of Love Schools and Bytes Farms Group of companies and he is a resident of Lilongwe. He is a graduate of Electrical & Electronic Engineering from the University of South Bank in London, England. He graduated with a Bachelor's degree with Honors in 1988. In addition, he attained the following professional courses: Christian Leadership Course in Singapore in 2005 and Public Relations course at Staff Development Institute, Blantyre 2000.

Before his appointment into this NCST Board in 2020 as a commissioner where he is currently serving as vice chairperson in the Science and Awards Committee (SAC), he served in other boards in public and private sectors as follows: Commissioner Maele has served as a PUBLIC UNIVERSITIES STUDENT LOAN TRUST board trustee for 3 years from 2008 to 2011 in the Accounts and Audit Subcommittee where he oversaw the establishment of a secretariat and set up procedures to successfully recover student loans.

He also served in this board as chairperson for BAPTIST publications board chairperson for 3 years from 2004 to 2007. Among many objectives we were tasked with capacity building for the entire Publications. We were also mandated to ensure that Baptist Publications was professional and self-sustaining.

He also served in Baptist Convention of Malawi Land Task Force as chairperson between 2014 and 2019. We had been mandated to identify, purchase and develop land to house the Baptist Convention of Malawi National Headquarters.

He served in BWB board as chairperson of Projects and Finance Committee from 2016 to 2020. During that period, I oversaw the design, selection and implementation of the Likhubula (Mulanje) to Blantyre Water Supply Project. I also successfully presided over presentations of potential PPAs in renewable energy from across the globe.

In addition to being a Commissioner at NCST, he is also currently serving in GLORY OF GOD CAMPUS WORLDWIDE MINISTRIES as board chairperson since 2014. This ministry is affiliated to missionaries across the globe including Australia, India, South Africa just to mention a few countries.

Commissioner Dan Kapatuka



Commissioner Daniel Kapatuka currently works for Plan International Malawi (PIM) as the Regional Manager responsible for Central-West Region.

Dan Kapatuka's work at Plan International Malawi ensure that there is a just world that advances children's rights and equality for girls through engagement of people and partners so that they can empower children, young people and communities to make vital changes that tackle the root causes of discrimination against girls, exclusion and vulnerability.

PIM believes that education is one such key tool that can benefit girls to move out of poverty and help their communities in return as such Science and Technology is one area that the organization champions to support as many girls as possible to occupy key positions in the country.

His role therefore at NCST entails working with the Commission to support more girls adopt science and technology as a means to an end and advance their education. He is the Chairperson for the Finance and Administration Committee (FiAAC) and therefore works hand in hand with the two functions to make sure that we make comprehensive decisions that can help shape the future for Malawi in the Science and Technology field.

He is very passionate about Science and Technology and together with the NCST board and Secretariat have been pivotal in drafting the Science and Technology Regulations which will help to shape and transform the STI field for the country.

Commissioner Prof Kenneth Wiyo



Dr Kenneth. A. Wiyo is an Associate Professor in Water, Irrigation and Soils Engineering, He is a former Dean of Faculty of Agriculture, Bunda Campus, Lilongwe University and has been a Director for six years at Centre for Agricultural Research & Development, the research, outreach and development arm of Bunda College.

Has experience in policy formulation, dissemination and advocacy by engaging with senior government, donors and civil society.

He has taught and researched on water supply, irrigation, sanitation, hydrology and hydrogeology (groundwater) for over 20 years and has technical expertise in these areas. He has expertise in developing strategic plans. For 3 years, he was Senior Programmes Development specialist with USAID Malawi overseeing their agricultural portfolio especially project management. Engaged at very senior level with government, diplomats and NGOs heads.

He has extensive project management experience in water supply, agricultural, irrigation and business sectors having worked on Identification stage of the EU support in Malawi which included a review of the EU Programs in Malawi. He was part of IFAD team that designed PRIDE project and has researched and written extensively on water supply, irrigation and sanitation issues in Malawi as well as deforestation and how it impacts groundwater and surface rivers. Dr Wiyo has experience in carrying out feasibility studies and ESIA. Dr Wiyo has expertise in water supply, irrigation, sanitation, hydrology and hydrogeology, watershed management, environmental management, agriculture, entrepreneurship, facilitation, large scale surveys training, project management and diplomatic interactions at senior level. He has experience on policy development and advocacy. Dr Wiyo will bring to the table, strong analytical, organizational and change management capabilities. Dr Wiyo is a commercial farmer growing crops, livestock, tree plantation and beekeeping. In his spare time, he likes to write poems and essays on development and social issues

Commissioner Prof Kenneth Maleta



Prof. Kenneth Maleta is an esteemed figure in the field of Epidemiology and Public Health, holding the position of Professor at the University of Malawi's College of Medicine. With an academic foundation in general medicine and epidemiology, he has established himself as a distinguished expert in his field.

His contributions to education and research are highly regarded. Currently. serving as a Professor of Public Health and Family Medicine, at the College of Medicine in Malawi. Kenneth Maleta has achieved significant milestones in his career, his journey includes various prominent roles within the University of Malawi's College of Medicine. Notably, he has held positions such as Deputy Chair of the Division of Community Health, Dean for Postgraduate Studies and Research, and Principal for the College of Medicine.

Prof. Maleta's research focus centers on epidemiological research related to the prevention and treatment of undernutrition.

His work has particularly concentrated on maternal and childhood undernutrition, with a strong emphasis on food-based interventions. He has also explored aspects of childhood growth and development, body composition, and the intricate interplay between nutrition and infection. His professional interests extend to HIV, health systems, and medical education, reflecting a comprehensive engagement with public health matters.

1.0 RESEARCH, TECHNOLOGY AND INNOVATION MANAGEMENT

1.1.1 Launch of the National Research Agenda

The Minister of Education, Honorable Madalitso Kambauwa-Wirima said Malawi needs to embrace and integrate Research, Science, Technology and Innovation in its development planning and the transformative process if the country is to attain its developmental aspirations.



Honourable Minister of Education, Mrs Madalitso Kambauwa – Wirima, MP

Kambauwa-Wirima made the remarks in Lilongwe at the launch of the first-ever National Research Agenda for Malawi, which is part of Government efforts towards operationalizing the Malawi 2063 First 10-Year Implementation Plan (MIP-1).

The development of the Research Agenda embraced a highly consultative process involving all key players in the research and innovation ecosystem including universities, public research organizations, think-tanks, private sector organizations, business enterprises, government ministries, departments and agencies (MDAs) and non-state actors.

Kambauwa-Wirima observed that the divide between the Global North and Global South in the attainment of development and economic transformation is a result of failure by Global South to invest in Research and Development and Science, Technology and Innovation.

> "As a country, therefore, we need to put in place ways of arresting this divide. The launch of the National Research Agenda is, a positive step towards narrowing this research and development expenditure gap if are to attain an inclusively wealthy and lower middle-income status by 2030," she said.

The Minister said she was particularly pleased to note that the themes and priority areas of the agenda are organized according to MW2063 pillars and enablers, which include Agricultural Productivity and Commercialization; Industrialization, Urbanization, Mindset Change; Effective Governance Systems and Institutions; Enhanced Public Sector Performance; Economic Infrastructure; Human Capital Development; Private Sector Dynamism; and Environmental Sustainability.



Honourable Minister of Education, Madalitso Kambauwa-Wirima and the Board Chairman of NCST standing with representatives of the Higher Education Institutions

She said the rationale for this approach is to ensure that Malawi's research, science, technology and innovation interventions are locally driven to solve socio-economic development challenges.

"The NRA will prioritize activities that are critical to achieve the desired transformation of the Malawi economy through R&D investments and has been framed by the Malawian Research Ecosystem consultatively to solve locally demand driven challenges. I therefore direct NCST to immediately put up a Research Call through the NRA that will solve negative effects of CYCLONE FREDDY using available resources in the Science and Technology Fund.

"In addition, I encourage youth and Early Career Researchers (ECR) to respond to the Call that will evoke the application of Predictive Artificial Intelligence (AI) to project occurrence of these natural disasters and help improve preparedness to such catastrophic phenomena. I call upon all well-wishing organisations to support NCST in its quest to provide solutions through Science, Technology and Innovation," said Kambauwa-Wirima.



Acting Director General, Gift A. Kadzamira making welcoming remarks at the National Research Agenda event

NCST Acting Director General Gift A. Kadzamira said the agenda will guide researchers, academic institutions, centers of excellence, local and foreign research and development stakeholders in generating knowledge, technologies and innovations that will build a knowledge-based economy from Malawi towards inclusive wealth creation and self-reliance.

Kadzamira added that with the agenda in place, Malawi will have coordinated research areas and outputs. The Acting Director General said that the agenda launch is the perfect roadmap to lead the nation to its longed-for success. The agenda, if well popularized, as expected, will help drive the nail home in terms of why the sector is actually the key to the growth of any serious national economy.

1.1.2 Consolidation of responses for the S&T regulations from Ministry of Justice

The process for developing the Science and Technology Regulations has been on-going since 2021. NCST has been consolidating responses to the comments raised by the Ministry of Justice. The responses were meant to provide clarification in some areas where the ministry was not clear. To that effect a log matrix was prepared where a response was prepared to the different comments that the Ministry raised. The clarifications have since been submitted to the Ministry of Justice for them to proceed with vetting and finalization of the regulations.

1.1.2 Implementation of S&T Fund – Institutional Grants Awards: MZUNI and UNIMA receive K79 million in grants from NCST



Representatives of Mzuni and UNIMA (Centre for Social Research) who received the 2022/23 Awards

The National Commission for Science and Technology (NCST) supported Mzuzu University and Centre for Social Research of the University of Malawi (UNIMA) with 79 million Kwacha to support the strengthening of Research, Science, Technology and Innovation. Mzuzu University received 39, 810, 000 million Kwacha while Centre for Social Research received 39, 697, 914 Million Kwacha.

Speaking after presenting a cheque to both institutions, Acting Director General for National Commission for Science Technology Gift Kadzamira said there has been inadequate funding and resources for researchers in Malawi to carry out research and as NCST they have what they call science and technology fund which support researchers with money to carry out research.

"The fund was resourced for the first time in 2021 with 291 million Kwacha and at the moment in the 2023/24 fiscal year we have received 450 million kwacha. So, we give out the money to researchers so that they are able to carry out research. This is research that will make impact, research that will solve our society challenges, research that is local not donor driven. So, in that way, the grants that we have given to MZUNI and CSR are going to make positive impact to our local needs in the country," said Kadzamira.

She added that it is important that people in the country solve the country's problems and research is key to achieving that objective. According to Kadzamira, researchers have been carrying out research that has been donor driven and donor funded, meaning that such research answers to the needs of the donors.

> "Funding our research using our own resources donated by the Malawi Government means we will be solving our own challenges which will make positive impact to the social economic needs of our country," explained Kadzamira.

In her remarks, Acting Director for Centre for Social Research Associate Professor Chrissy Thakwalakwa commended NCST for the support saying it will go a long way because they did not have resources like computers and software for data analysis.

> "So, this support will help us to produce good quality data and also be able to train junior staff and even our post graduate students at UNIMA, to be very well equipped in skills to undertake research, to do with knowledge management and data analysis," said Thakwalakwa. She added that if Government and other entities continue to support researchers, they will be able to tackle problems that we have on the ground.

"When it's development support it is usually an idea that comes from the donors and we have to dance to that idea but when we did our own, we knew our problems," she added.

1.1.3 Launch of Open Forum on Agriculture Biotechnology

The Open Forum on Agricultural Biotechnology (OFAB) is an advocacy project for the African Agricultural Technology Foundation (AATF) that contributes to creation of an enabling environment for biotechnology research, development, and deployment for the benefit of smallholder farmers in Africa. The launch for OFAB Malawi Chapter was held on 1st April 2022. The event played three critical roles. Firstly, it provided an opportunity to engage media and the general public about the existence of OFAB in Malawi and its mandate in complementing the government efforts in enhancing public understanding of agricultural biotechnology. Secondly, it created a platform from which scientists can use to provide the state of Science, Technology, and Innovation in Africa and in Malawi and propose policy suggestions for improvement for STI in general and agricultural biotechnology in particular. Thirdly, it offered an opportunity to strengthen collaboration between the African Agricultural Technology Foundation (AATF) and the Malawi Government to explore other agriculture related investments that could be undertaken jointly.



Honourable Minister of Education, Honourable Agnes Nyalonje.



Honourable Minister of Education, Agnes Nyalonje. and Drof AATF

1.1.4 Resurgence of the Ethanol Driven Vehicle (EDV) Programme



The program started earlier 2010 than when the government saw a need to commercialize ethanol as vehicle fuel. It was agreed that it is possible to use ethanol as a blending or using it at its own right. In 2012 the government approved а cabinet paper which authorized the use of ethanol as vehicle fuel. As one of the Reform Areas approved by Government, the Commission has initiated the process of resurrecting the EDV Programme. NCST is part of the EDV team that was set to revive the EDV programme. In

this regard, the main activities undertaken during the period under review include;

- i. engagement with Greenbelt Authority, MERA and Press Corporation which expressed interest in ethanol production through sugarcane and cassava plantations.
- ii. A Project concept for the EDV

1.1.5 The fourth National Research Dissemination Conference (NRDC) from 25-26th January 2023 at Crossroads Hotel Lilongwe



Honourable Minister of Education, Agnes Nyalonje and delegates at the National Research Dissemination Conference

NCST in collaboration with its partners, organised the 4th National Research and Dissemination Conference, whose theme is 'Research, innovation and entrepreneurship the key drivers to an inclusively wealthy and industrialized nation." from 25-26 January 2023 at Crossroads Hotel Lilongwe. The NRDC is conducted every two years. The NRDC was officially opened by the Minister of Education, Honourable Agnes Nyalonje.

- i. The objectives of the conference were as follows:
- ii. To promote uptake of research results
- iii. To provide a platform for researchers and innovators to showcase their work
- iv. To promote collaboration, networking and partnerships among researchers, innovators and other stakeholders
- v. To facilitate evidence-based policy decision making
- vi. To promote knowledge exchange and transfer

The 4th NRDC comprised of key note addresses, paper presentations and, technology/innovation exhibits which were organized according to the following were thematic areas:

i. Agricultural productivity and commercialization

- ii. Education and human capital for socio economic development
- iii. Social sciences, humanities, and inclusivity
- iv. Health, population and nutrition
- v. Environment; and natural resources; management and climate change
- vi. Infrastructure, energy, transport and engineering
- vii. ICT, financial inclusion and knowledge management
- viii. Urbanization and; rural development
- ix. Trade; industrial development and tourism

The 4th NRDC received 114 abstracts which underwent preliminary screening for compliance to the call requirements 101 abstracts were recommended for peer review. 86 papers were successful to be presented during the conference and a total of 42 papers were presented during the conference about 50%.

Challenges

- i. Combining of the NRA launch and 4th NRDC
- ii. Indecision on the guest of honor delayed
- iii. Not all accepted presenters attended the conference
- iv. Some parallel sessions were not well patronized
- v. Parallel sessions tended to limit participants to sessions related to their profession
- vi. Change of dates for the conference may also have affected participation
- vii. presenters paying registration fee just like other Participants
- viii. Hosting the conference in LL may not have been attractive to prospective participants from Lilongwe

Recommendations

- i. Improve pre-conference preparation, such as programme amendments, presenters' readiness, documentation etc
- ii. Reduce number of parallel sessions or just having one plenary for all presentations
- iii. Improve programming of the conference by sticking to advertised conference dates
- iv. Synchronizing the national conference vs their institutional thematic conferences
- v. Consider a lower fee for presenters or waiving the fee all together
- vi. Making a follow-up on the remaining 3 papers

1.1.6 Stakeholders' validation meeting on Stack Events Guidelines

NCST in collaboration with Environmental Affairs Department is developing Guidelines for the evaluation of products with stack trait events. Gene stacking refers to the process of merging two or more genes of interest into a single plant. Biotech stacks are engineered to have better chances of overcoming problems in the field such as insect pests, diseases and weeds at the same time. Research has shown that gene stacking approach has the potential of resistance breakdown as it is more difficult for the pest to overcome multiple insecticidal proteins. Work on developing the guidelines made significant progress to the extent that a

1.1.7 Monitoring and Evaluation: Sensitizing Members of the Parliament Committee on Education Science and Technology through visits Science and Technology Funded Innovations



Benedicto Kankhulungo (centre) captured with Members of Parliament and NCST Commissioners and staff

The National Commission for Science and Technology (NCST), recently invited Members of the Education, Science and Technology Committee of Parliament and NCST Commissioners to appreciate the progress that the Commission is making in promoting innovation in Malawi through its Science and Technology fund, which it uses to fund local innovators in the form of grants. The tour of duty took the MPS and the Commissioners to Liwonde where they visited

Benedicto Kankhulungo and Golomoti where they visited a local innovator in the name of Mandela Chilenje.

NCST has expressed its commitment in promoting and nurturing innovation talent by providing technical and financial support to the innovators. Using the K300 million Science and Technology Fund the government allocated in its 2022-2023 Financial Year, the Commission has been supporting over 30 young innovators across the country to realize their dream of bringing electricity to their communities, and other developments.

Benedicto Kankhulungo, who comes from Traditional Authority (T/A) Sitola in Liwonde Machinga, is one of the beneficiaries of the fund. He has produced electrical power amplifiers, which he uses to amplify, increase, and boost the quality of power through increasing the input signal's voltage. His unique technology multiplies the electricity voltage in that if, under normal circumstances, a solar panel supplies 100Watts, connecting it to the system will bring the voltage up to 800Watts.

His motivation came after observing that the country was ridden with frequent blackouts and he was encouraged to bring a solution to this national challenge. Also moved by the energy challenges that his community was facing, he decided to bring a solution that will make life easy for his family and that is how he lit up his community with electricity. Kankhulungo is also working on other innovative ideas that will concentrate on giving solutions in the agriculture field and he believes that if he is given support, his community will be developed and this will contribute to the overall development of the country.



The amplifiers are currently undergoing final tests at the Malawi University of Business and Applied Sciences (MUBAS) lab.

In Dedza, the Commission is working with Mandela Chilenje of Chikwereza Village in the area of T/A Kachindamoto. He is using locally available raw materials to produce electricity. He has powered six houses using solar power and is seeking help so that he can develop his community through his innovative ideas.

Chilenje earns a living from his innovations and apart from powering 6 houses, he has a homemade grinder and created a reservoir that preserves rain water for home use. He said given the financial support amounting to 30million kwacha he can power up to 500 houses in his village and can make a contribution towards the Malawi vision 2063, one of whose pillars is energy advancement.

Eng. Frank Maele, NCST Commissioner, was among the NCST Commissioners that visited the innovators. He expressed his institution's enthusiasm to promote and nurture natural and grassroots talent.

"These innovators have the potential to transform their societies into towns and mini cities and make a contribution towards transforming Malawi. It is against this background that this Commission commits itself to the promotion and nurturing of natural talent in our young people," he said.



Mandela Chilenje (3rd from left) standing under the transformer that powers his electricity

Mr Maele, however, lamented the limited resources that the Science and Technology Fund receives from the Central Government. He pleaded with the Education, Science and Technology Committee of Parliament to advocate for the increase of the budgetary allocation to the pool.

The Chairperson of the Education, Science and Technology Committee of Parliament, Brainax Kaisi (MP), expressed his satisfaction with the strides that these innovators are making in improving the quality of life for their communities. Honourable Kaisi, Member of Parliament for Nkhotakota South Constituency assured NCST that the committee will push for an increased allocation to the Commission in the next financial year. The committee also recommended that these innovations should be assessed by relevant institutions, such as the Malawi Energy Regulatory Authority (MERA), for quality control and also to provide the relevant technical support.

1.1.8 Regulating Cross Border movement of GM animal feed

NCST has conducted stakeholder consultations with government officials handling cross border movement of products, with focus on importation of GM products and animal feed. The consultations were undertaken against a background of reports that consignments of imports of animal feed derived from GM crops and products was in most cases detained at the border due lack of appropriate procedures or guidance documents for their imports and management.

The essence of the consultations was to establish current procedures for clearing products derived from GM crops and non-GM crops, assess the knowledge and determine possible interventions to align procedures with the requirements of the Biosafety Act and Regulations.

A summary of findings following the consultation meetings revealed that most officers are not aware of laws governing issues of Genetically Modified products with respect to clearing the same at border posts. As a solution, NCST proposes that Training sessions for border staff on the Biotechnology Policy and Biosafety Act and Regulations must be conducted; and that NCST and EAD should urgently consider developing Guidelines for cross-border movement of GM products in line with the requirements of the Biosafety Act.

1.1.9 Patent Processing with Ministry of Education (MOE) Lawyer Unified Electrical Power Amplifier

PATENT AND TRADE MARKS JOURNAL (INCLUDING DESIGNS)					14
		PATENTS	AND TRADE MARK	S OFFIC	CE
OFFICIAL NOTICES OF PROCEEDINGS UNDER THE PATENTS ACT, CAP. 49:02, AND THE TRADE MARKS ACT, CAP. 49:01					
NOTE—Neither the the accura	e Patent and Tr cy of its publica	ade Marks Office ation or undertake	nor the Government Printer, acting any responsibility for errors or om	g on behalf oj vissions or the	the Government of Malawi, guarante
		1.	PATENTS		7
		PATENTS	COMPLETE SPECIFICATIONS	ACCEPTED	
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As soon as accepted as accepted as accepted as accepted as a accepted as	Date of Logding 06/02/2023 RADE M ONS FOR TH TRADE M	Date specification intyre (at a charge ations and drawing Date of Acceptance 18/04/2023 MARKS E REGISTRATIC ARKS	has been advertised, it may be insp ts may be obtained from the Patent SCHEDULE Name of Applicant Benedictor Kankhulungo Address for N OF Number 6/202	ected during of s Office on particular of the second secon	office hours at the Patent Office, Fatimi syment of the prescribed fee. Title Unified electrical power amplifier arlotte Ray & Associates, Area 6, Plo 54, Lilongwe, Malawi.

The National Commission for Science and Technology (NCST) in Malawi has identified a Unified Solar power booster technology developed bv Benedicto Kankhulungo in Machinga as an innovative solution. technology This significantly increases solar power output, allowing for more load capacity. The NCST conducted preliminary technical tests in collaboration with the Malawi Bureau of Standards and found the innovation to be novel and economically

beneficial. To support the innovator, NCST has signed a research and development agreement and engaged the Ministry of Education's lawyer to assist in drafting patent application claims for the technology. The lawyer gathered relevant information during a meeting in Liwonde, Machinga, and the next step is to draft the patent application to be filed through the Registrar General's Office. The technology has the potential to reduce the costs of acquiring solar power and enable consumers to generate more power with fewer solar panels. In the year 2022, NCST helped to protect the innovation through a local patent shown above.

2.0 INFORMATION AND KNOWLEDGE MANAGEMENT

2.1.1 Research and Development Survey Findings

NCST in collaboration with the National Statistical Office organized a Vetting Meeting of the National Research and Development Survey findings at Chikho Hotel in Mponela. The meeting was chaired by the Acting Commissioner for Statistics from NSO and comprised NCST Management and Chiefs of Research and Technology Transfer Divisions. The Meeting agreed that the Planning Section that leads this activity and NSO as TEAM Leaders in the Survey incorporate comments and then plan for a Validation Meeting in June 2022. The Validation meeting took place at Golden Peacock Hotel in June 2022 where NSO and NCST jointly presented the findings to Research and Innovation stakeholders.

Summary of Key Findings for 2019/2020 Research and Development Survey for Malawi

Key Indicator	2019/2020	
	MWK ('000')	(%)
Gross Domestic Expenditure on R&D (GERD)	14,626,918	0.17
Higher Education Research and Development	7,279,785	49.8
(HERD)		
Government Expenditure on Research and	3,965,203	27.1
Development (GovERD)		
Private Not for Profit Research and Development	2,690,626	18.4
(PnP)		
Business Expenditure on Research and	691,304	4.7
Development (BERD)		

Funding Sources		
Government Funded R&D	2,251,167	15.8
Business Funded R&D	4,311,331	29.3
Higher Education Funded R&D (includes	2,051,249	14.0
University Own Funds)		
Foreign Funded R&D	4,910,125	33.4
Private Not for Profit	1,103,046	7.5

Distribution of R&D Expenditure by Type		
Basic Research	4,636,733	31.7
Applied Research	6,655,248	45.5
Experimental Development	3,334,937	22.8

R&D Personnel	НС	FTE
Total R&D Personnel	2,828	1,653
Total Researchers	1,255	470
Female Researchers	393	146

Total Technicians	599	414
Total Support Staff	974	769
Total R&D Personnel per million population	157	103
Total Researchers per million population	70	26

Indicators Computed from R&D Survey	
GERD as a % of GDP	0.17

2.1.2 NCST Orients Journalists in Science and Technology Reporting

The NCST is encouraging journalists to report more on science and technology. The Director of Planning said that many journalists are afraid of reporting on these topics because they think they are too complicated or boring. However, he said that with proper preparation, reporting on science and technology can be one of the most interesting and rewarding jobs a journalist can do.

Here are some tips for journalists who want to develop an interest in science and technology reporting:

- Start by learning the basics of science and technology.
- Find a mentor who is already reporting on these topics.
- Attend science and technology events.
- Be curious and ask questions.

2.1.3 NCST Cheque presentation to Kasangadzi Community Skills Development Center in Mzimba and finalizing MOU between Kasangadzi CSDC, NCST & TEVETA on 13th March, 2023



On 13th March, 2023 the Commission presented a cheque to Kasangadzi Community Skills Development Center in Mzimba towards teaching material for the center as one of NCST Innovation beneficiary of Science and Technology fund. The event included the media with the purpose was to create public awareness about the commission 's mandate on Science, Technology and Innovation promotion and support towards the grassroot innovators.

During the ceremony NCST's Director General thanked the innovator Cohred Nkosi for the innovative mind and commitment shown. He added that the Commission will continue supporting grass root innovators through the Science and Technology fund in order to complement the Malawi 2063 vision, so that Malawi become a self-reliant and industrialized nation. The Commission also thanked TEVETA for the support is rendering to Kasangazi Community Skills Center and the Commission will continue working together with TEVETA in developing the center. The community leaders thanked the commission for fulfilling the promise of supporting the center with grant for learning materials.



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On 13th March, 2023 the Commission presented a cheque to Kasangadzi Community Skills Development Center in Mzimba towards teaching material for the center as one of NCST Innovation beneficiary of Science and Technology fund. The event included the media with the purpose was to create public awareness about the commission 's mandate on Science, Technology and Innovation promotion and support towards the grassroot innovators.

3.0 SCIENCE, TECHNOLOGY AND INNOVATION INFRASTRUCTURE DEVELOPMENT



District Commissioner for Dowa standing and Principal Secretary for Lands and Housing seated with TA Chiwere on 17th March 2023

NCST has been struggling to find land for the construction of the Multipurpose STI Infrastructure. The Board of Commissioners have in the past tried to influence policy makers to ensure that NCST obtain land through the Ministry of Lands through the Secretary for Education. Efforts did not bear much fruit until the Presidential Delivery Unit intervened and initiated a lab session on Mvera Innovation City concept that was hatched due to the need to industrialize Malawi through digitalization and innovation.

On 16th March a full District Council was convened and the meeting was witnessed by PDU, MACRA and NCST in Dowa district. During this meeting the Council unanimously approved to allocate the initial 200 of the 1,000 ha required for the Innovation City. The meeting resolved that on the next day, 17th March 2023 there should be a

sensitization meeting in which the DC and the Principal Secretary had to speak to the people of Chipala area where the land allocated to the project begins.



Pictures above show the remaining shells or ruins of Chipala Train Station area where the perimeter survey was initiated by the Surveys department.

The approval of land for the establishment of the Mvera Innovation City has allowed NCST to start processes of initiating feasibility studies for the Construction of the Multipurpose STI Infrastructure Project which will house all the components of the project starting from innovation incubation facilities, technology discovery centre, ICT infrastructure, multi-storey office space, science and innovation park for exhibitions, auditorium and sports centre for promoting sports sciences among others.

4.0 FINANCIAL RESOURCE MOBILIZATION

4.1.1 NCST-AUDA NEPAD on Grand Challenges Malawi Concept

On 17th January 2023 NCST and AUDA-NEPAD held a consultative meeting at Mt Soche Hotel where AUDA-NEPAD expressed support to support NCST to establish the Grand Challenges Malawi initiative following the proposed request NCST had presented to AUDA-NEPAD. The meeting was attended by the Board Chairperson, Professor Emmanuel Kaunda, Vice Board Chairperson Dr Cecilia Maliwichi Nyirenda and the Acting Director General Gift A. Kadzamira and Acting Director of Planning, Kondwani Gondwe. Representing AUDA-NEPAD were officers from the Office of Science, Technology and Innovation led by the Executive Director, Professor Aggrey Ambali.



Members who attended the NCST-NEPAD Consultative Meeting

AUDA-NEPAD plays a critical role in championing the establishment of national financing mechanisms for R&D. To this end, AUDA-NEPAD convened a technical consultation in Blantyre, Malawi from 16 to 20 January 2023 as an initial step in deliberating strategies for establishing

National Grand Challenges to accelerate investment in R&D in response to NCST's proposal of October 2022. The objectives of the January consultation were to:

- i. Understand the landscape for domestic resources of financing R&D,
- ii. Engage Government officials and representatives from non-state entities on how best to establish National Grand Challenges in Member States,
- iii. Formulate a joint action plan to mobilize resources for National Grand Challenges, and
- iv. Foster cross learning and sharing of best practices with already established Grand Challenges Africa and other National Grand Challenges on the continent.

NEPAD fostered establishment of the Grand Challenges Africa as one of the financing instruments being explored to accelerate investment in R&D at continental level. It seeks to promote African-led scientific innovations by focusing on Africa's scientific priority setting, impactful robust solutions and products from scientific research to support Member States attain Sustainable Development Goals. The GCA is now responsible for helping Innovation leading institutions in member states to establish their national grand challenge programme at country level. The meeting resolved that NCST should prepare a Grand Challenge Briefing to the Minister to seek support for Malawi to be part of the match-funding Grand Challenge Initiative and also prepare a Workplan to help NCST start consultative processes towards the milestone. The workplan was developed but is subject to review following more consultations that will follow the post-consultative meeting with NEPAD.

4.1.2 Research and Innovation Management Project through the African Centre for Technology Studies (ACTS)

As a member of the Science Granting Council Initiative (SGCI), NCST participated in the Learning Consolidation workshop held in Ghana from 27th February to 3rd March 2023. The SGCI Learning Consolidation Workshop 2023 was a great platform for you the SGCs' representatives, researchers, scholars, and experts from various fields to learn and share knowledge, and your active participation played a significant role in making the workshop informative, engaging, and insightful. NCST was represented by Mr Lyson Kampira, Mr Kondwani Gondwe and Dr Sefren Khumula together with two Principal Investigators, Professor Wales Singini and Dr Keston Njira who represented other researchers who implemented research projects under Phase II. Some of these research projects were near completion and a few other projects are still ongoing. Participants provided meaningful, insightful questions, valuable comments, and thoughtful feedback are much appreciated, and they added immense value to the workshop. The new Research and Innovation project will provide grants amounting to \$250,000 under the collaboration with the African Centre for Technology Studies (ACTS) based in Kenya.



Mr. Kondwani Gondwe, MEL expert of SGCI Malawi presenting the status of the implementation and the benefits Malawi has registered since the inception of the SGCI-II

The following were the outcomes of the Workshop:

- i. SGCI Consortium approved a no-cost extension of the delayed projects until 31st June 2023
- ii. ACTS presented a Call to all SGCs for an Expression of Interest on a new Project entitled Research and Innovation. NCST had earlier on already written a proposal to ACTS on support for Research and Innovation following NCST's invitation to the Governing Council of ACTS which NRCM (now NCST) was a founding member or signatory to the Charter that established ACTS alongside Burkina Faso, FONSTI. The project cost is estimated at \$250,000 for 18 months.

5.0 **DEVELOPMENT PROJECTS**

5.1.1 Waste to Energy Project in Malawi

NCST is coordinating one of the Waste to Energy Projects in Malawi aimed at the generation of electricity from waste using gasification. A project concept was developed and it was shared with stakeholders for their input. Various meetings have been held physically and virtually to discuss financing requirements and acceptability of the project. It was clear that there is need to undertake feasibility studies to determine the sources of the waste, power requirements, energy demand, sites for the plants and cost of equipment. It was therefore agreed that a full proposal for the feasibility studies be developed and be submitted to various stakeholders for funding consideration.

NCST in collaboration with MUST have developed a full proposal for full feasibility studies and has been submitted to the prospective investor for funding consideration.

5.1.2 SGCI Management of Research Projects – Renewable Energy

Following the awards of three (3) additional SGCI grants in Renewable Energy, NCST continued to administer and coordinate the implementation of the projects. The projects have engaged international research collaboration with researchers in Malawi, Zambia and Mozambique taking a part. Each project was awarded a total of MK22,000,000. The projects are as follows:

- i. Towards Technology Sustainability Through Upscaling and Commercialization of Biogas Generation in Malawi, Mozambique and Zambia" – Implemented by MUST
- ii. Invasive Alien plants (IAPs) for eco-friendly energy: From environmental problem to economic asset Implemented by LUANAR
- iii. Assessing the Performance of Solar Drying Technology in reducing Post-Harvest Losses of Fruits and Vegetables along the Supply and Value Chains - Implemented by MUST

During the period, NCST participated in the project activities such as review of technical reports and monitoring and evaluation of project implementation. On 28th May, 2022, the Section participated in the SGCI projects tracking meeting.

5.1.3 Transforming Public Universities across Africa into Spaces for Innovation, Experimentation and Accelerated Learning

NCST as a way providing technical support services to the Technology Transfer Section, is participating in the "Transforming Public Universities across Africa into Spaces for Innovation, Experimentation and Accelerated Learning" project. the project is aimed at reconstructing and equipping an existing innovation hub and design studio at the Malawi University of Business and Applied Sciences (MUBAS) so that it becomes a space for ideation, designing (prototyping) mentorship/ incubation, testing, learning and entrepreneurship for the achievement of both the country's development strategy, and the SDGs. In the first year of implementation, the innovation lab will be supported to test two solutions:

- Solution 1: "Refining and upscaling a solar power amplifier as an affordable and sustainable energy solution"
- Solution 2: "Refining and upscaling a local revenue management system as an effective public financial management tool"

5.1.4 Implementation of the Linthipe Secondary School Biogas plant Project

As a way of promoting partnerships and renewable energy technologies, NCST has been facilitating and supervising the implementation of the Linthipe Secondary School Biogas project since 2021. The Project is funded by a friend of the school based in Scotland. The objective of the project is to develop a biogas plant at the school. The Biogas plant will use effluent from the girls' hostels and kitchen and food waste. The Biogas will be cleaned and used for heating in the school's laboratory and slurry from the plant will be used as organic fertilizer in the school's garden.

5.1.5 Project Implementation: Assessment of compliance to standards and quality assurance in locally manufactured concrete blocks

NCST in collaboration with Malawi Bureau of Standards and National Construction Industry Council of Malawi (NCIC), are implementing a project on assessment of compliance to standards and QA in locally manufactured concrete blocks in Malawi. The project is funded by NCIC to a tune of about MWK10,000,000. The main objective of the project proposal is to address the knowledge gaps that exist in the production and usage of concrete blocks in Malawi. The objective of this study is to assess the compliance to standards and quality assurance of concrete blocks being used in the building and construction sector in Malawi. Questionnaires were administered to selected manufactures of cement blocks in Blantyre, Lilongwe, Zomba, Mzuzu, Dedza, Karonga, NkhataBay, Salima, Dedza, Mulanje and Mangochi. Samples of cement blocks were also collected from some of the manufacturers.

5.1.6 Developing Circular Economy Roadmaps for abating GHG emissions from the Waste Sector in Africa – A Regional Approach

The National Commission for Science and Technology (NCST) is leading a project in Malawi, supported by the Climate Technology Centre and Network (CTCN), to promote the Circular Economy and reduce greenhouse gas emissions in the waste sector. The project has a budget of USD 200,000 and involves TNO of the Netherlands as the main consultant, along with local consultants from SIB-K in Kenya. The objective is to develop country-specific roadmaps for the circular economy, with a focus on the waste sector. A final stakeholder workshop was held in April 2022 to gather input and validate the project's roadmap and pilot concept. The roadmap includes components on plastic, municipal waste management, and circular economy for plastics. The workshop also emphasized the need for change in four underlying subsystems: enhancing the institutional environment, promoting collaboration, increasing knowledge development, and improving physical infrastructure. A concept for a decentralized integrated waste transfer and recycling station pilot plant was presented, highlighting challenges such as funding, land acquisition, and establishing a plastic waste collection and processing network. The project report, including the roadmap and pilot concept, was circulated to stakeholders for review and feedback. The consultant submitted the final deliverables, which included a baseline assessment, analysis of existing initiatives and key players, circularity analysis of plastic waste, and waste stream-specific roadmaps for the circular economy in plastic waste management and a pilot business plan for a decentralized integrated waste-transfer station

5.1.7 Project: Discharge Conveyance Systems for the Strategic Grain Reserves for Mzuzu and Luchenza Maize Silos

NCST since July 2020 is part of the Technical Working Group (TWG) of 5 Engineers from NFRA, DARS, MUST, NCST and MUBAS that is working on the project. The objectives of the assignment were to Assess the existing maize discharge systems, redesign, procure and reinstall the discharge systems. Currently, the project is at the "Procure goods and services" stage. The main activity undertaken during the quarter was the pre-shipment visit to the manufacturer of the chain conveyor in Germany.

The pre-shipment visit was undertaken by the 5 engineers to "**Th. Buschhoff GmbH & Co. Germany**" from 27 – 29th April, 2022. The pre-shipment inspection was undertaken by a team of local engineers hereinafter called Technical Working Group (TWG)

5.1.7 Energy Efficient Residential Refrigerators and Distribution Transformers in Malawi projects

Malawi together with other 7 countries in Southern Africa have embarked on Green Climate Fund (GCF) Readiness projects on 'Developing a National Framework for Leapfrogging to Energy Efficient Refrigerators and Distribution Transformers'. The implementation of the eight projects is primarily led by Climate Technology Centre and Network (CTCN) in coordination with the United Nations Environment Program's (UNEP) United for Efficiency (U4E) initiative. Additionally, the in-country implementation is managed by three implementers: (i) CLASP, (ii) Basel Agency for Sustainable Energy (BASE) together with the International Copper Association (ICA) and the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) as well as (iii) Pegasys. The project activities include:

- The Consultant finalized the draft National Policy Roadmaps (NRPs) for the project on leapfrogging to energy efficient refrigerating appliances and distribution transformers.
- Participated in the Policy Working Group meeting which was held in June 2022. During the meeting, the Consultant presented the draft National Policy Roadmaps (NRPs) to the members for their input. Participated in the quarterly Coordination Meeting for both projects.
- The meeting agreed on the next step: stakeholder consultations to be undertaken during the next quarter.

6.0 STATEMENT OF FINANCIAL POSITION AS AT 31 MARCH 2023

6.1.1 Balance Sheet

		2023	2022
	Note	MK	МК
ASSETS			
Non current assets			
Property, plant and equipment	4	<u>151,808,177</u>	161,760,964
Total non current assets		<u>151,808,177</u>	161,760,964
Current assets			
Inventory	5	13,069,350	14,262,250
Trade and other receivables	6	37,303,862	35,085,458
Cash and cash equivalents	7	446,400,623	224,909,468
Total current assets		<u>496,773,835</u>	274,257,176
Total assets		<u>648,582,012</u>	436,018,140
Capital Funds			
Capital Funds	8	88,793,410	88,793,410
Accumulated Funds	9	548,437,570	316,774,728
Total funds		<u>637,230,980</u>	<u>405,568,138</u>
Current liabilities			
Trade and other payables	10	11,351,032	30,450,002
Total current liabilities		11,351,032	30,450,002
Total funds and liabilities		<u>648,582,012</u>	436,018,140

6.1.2 Statement of Income and Expenditure

		2023	2022
	Note	МК	МК
Income			
Subvention and own			
collection	16(a & b), 18,23	1,171,931,960	892,665,407
Project income	17,19-24	1,270,845,866	286,812,819
Interest received	24 & 25	6,232,888	884,874
Sub Total income		2,449,010,714	1,180,363,100
Other comprehensive			
income			
Disposal of fixed assets	23	-	9,691,263
Total income		2,449,010,714	1,190,054,363
Expenditure			
Staff expenses	11	373,895,958	237,982,700
Operational expenses	12	670,040,465	494,132,996
Board Expenses	13	37,824,758	35,160,136
Bank and finance charges	14	1,946,674	1,692,897
Project Expenses	15	1,133,084,172	473,810,063
Total expenditure Surplus/(deficit) for the		2,216,792,027	1,242,778,792
year		232,218,687	(52,724,429)

More details on the Notes on the financial statements can be obtained in the full financial statement upon request.