



ANNUAL REPORT 2016-17

**National Commission for
Science and Technology**

Foreword



The financial 2016/2017 was very eventful for NCST. In April 2016, NCST signed a Memorandum of Understanding with Egypt's BAHGAT Group of Companies with the facilitation of Secretary General of Common Market for East and Southern Africa (COMESA) and Malawi Investment and Trade Centre (MITC). The purpose of the MOU is to establish a platform of cooperation in the fields of research and development, innovation and technology. In respect of the MOU, BAHGAT Group hosted and paid for the full cost of a 3 month training for three young Malawians selected from MUST, LUANAR and Chancellor College to study Nanotechnology in Egypt.

Furthermore, COMESA helped NCST secure scholarships for undergraduate training in Pharmacy and Pharmaceutical Industries; Dentistry, ICT for four young Malawians who were identified and facilitated by the NCST Secretariat towards the end of the year. The students will study at Sinai University in Egypt through funding from the Egyptian Government.

During this reporting period, NCST was made National Coordinator for African Regional Cooperative Agreement (AFRA) for Research and Training to strengthen and enlarge the contribution of nuclear science and technology at national level. NCST also initiated the setting up and usage of a peripheral Technology and Innovation Support Centre (TISC) to be within its control and this was made possible with the support from the Geneva-based World Intellectual Property Office (WIPO) and Department of Registrar General.

NCST also supported research activities in the environmental sector when it undertook a baseline study on waste characterization and greenhouse gases (GHGs) emissions in the City of Lilongwe on behalf of Lilongwe City Council and Environmental Affairs Department

Within its limitations, in the year 2016-17, NCST registered many gains and continues to establish itself through its mandate to oversee all issues of science, technology and innovation in this country.

A handwritten signature in black ink, appearing to read 'Anthony Muyepa'.

Anthony Muyepa
DIRECTOR GENERAL

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Networking and Collaboration

NCST nominated as the coordinator for African Regional Cooperative Agreement (AFRA)

In July 2016, the National Commission for Science and Technology (NCST) was nominated as the National Coordinator for African Regional Cooperative Agreement (AFRA) for Research and Training. The agreement has been set up to further strengthen and enlarge the contribution of nuclear science and technology at national level. This nomination will assist the Commission to expand its focus to promote, support, coordinate and regulate the development and application of research in nuclear science, technology and innovation for the socio-economic development of the country.

Hosting the GRC Africa Regional Meeting

During the Global Research Council (GRC) Annual Meeting that was held in Ottawa, Canada in May 2017, NCST Malawi and the National Science and Technology Council (NSTC) of Zambia were appointed co-hosts of the Global Research Council Africa Regional Meeting that was scheduled for November 2017 in Livingstone Zambia. Prior to the GRC Canada Meeting, NCST and NSTC held a Preparatory Meeting in Chipata, Zambia in April 2017 to come up with tasks which the host institutions would undertake.

Malawi's participation in international networks

Malawi, through the National Commission for Science and Technology participates in a number of International Networks, which aim to deal with global problems. Such networks include the Climate Technology Centre and Network (CTCN) to which, NCST is a National Designated Entity (NDE). The CTCN aims at developing technologies which will assist to deal with climate change issues both at national and international level. The network organizes regional meetings time and again in order to build capacities of the participating countries in the area of Climate Change. One such was held in Nairobi, Kenya from 27-29 September 2016 and the NCST represented the country. The purpose of the meeting was to develop and strengthen the regional network of NDEs and to strengthen their relationship with other research and technology development stakeholders at national and regional levels in order to identify matchmaking opportunities for funding climate research and technology activities. The meeting also discussed participation of the SADC Countries in a project to develop a Regional Efficient Appliance and Equipment Strategy in Southern Africa in order to promote efficient use of the limited power the different countries are generating at the moment.

SADC countries were therefore requested to sign the Agreement which was developed in order for countries to show their commitment to participate in the project. Malawi endorsed the agreement in October 2016 making the country eligible to participate in the project.

Implementing Science Granting Councils Initiative (SGCI)

NCST is participating in a project entitled Building Sustainable Research Management Capacity in Science Granting Councils in sub-Saharan Africa. The project is funded by DFID, IDRC and National Research Foundation of RSA. The project aims at fulfilling the following four objectives:

- Objective 1: Strengthening the ability of science granting councils to manage research;
- Objective 2: Designing and monitoring research programmes based on the use of robust science, technology and innovation indicators;
- Objective 3: Strengthening the ability of Science Granting Councils to support knowledge exchange with the private sector; and
- Objective 4: Strengthen partnerships among Science Granting Councils

As part of programme implementation, NCST conducted its needs and capacities assessment in respect of Objective 1 in order to identify capacity building areas for its staff and institution as a whole. The assessment consolidated report was submitted to the project secretariat in South Africa towards planning and implementation of the customised training interventions.

NCST also participated in a Science Granting Council Initiative (SGCI) – Theme #2 Inception Meeting and Need-finding Workshop that was held in Windhoek, Namibia from 3rd to 7th October 2016.

NCST hosted the Regional Workshop on Strengthening the ability of Science Granting Councils to collect, analyze and disseminate indicators relevant to STI policy and associated instruments at BICC from 3rd to 7th April 2017. Ten members of staff from NCST participated in this training. Other trainees were selected from relevant institutions in Malawi. In addition, two participants each from Namibia, Zambia and Zimbabwe also attended the workshop. The workshop was facilitated by NEPAD Agency of the African Union which is a technical agency contracted by the Science Granting Council Initiative (SGCI) to lead in the implementation of SGCI Objective NO.2 {which is Design and monitor research programmes, and to formulate and implement policies based on the use of robust science, technology and innovation (STI) indicators}. NCST is one of the SGCs participating in the SGCI.



Figure 1: Joint SGCs Initiatives Participants on STISA2024 and ASTIII Initiatives – Continental Validation Workshop

NCST introduced to Science Diplomacy

NCST participated at a joint workshop on Science, Technology and Innovation Strategy for Africa (STISA) 2024 and the African Science, Technology and Innovation Indicators Initiative (ASTII) which was held at SAFARI Court Hotel in Windhoek, Namibia from 22nd to 26 May 2017. The joint workshop was organized by NEPAD in collaboration with Southern Africa Research and Innovation Management Association (SARIMA). The workshop was attended by Science Granting Councils, SARIMA members, African Union (AU) member States that are involved in the ASTII, and International STI organizations. The following were the highlights of the workshop:

- Participants were introduced to the Concept of Science Diplomacy which can be used to provide advice to inform and support foreign policy objectives (Science in diplomacy); facilitate international scientific cooperation (Diplomacy for science); and improve international relations (Science for diplomacy)
- It was noted that a number of countries have established offices of a Science and Technology Attaché within their Ministry of Foreign Affairs. Some of their responsibilities include providing quality advice to foreign policy makers (ambassadors) on scientific and technical matters; reporting scientific and technological events; and representing their countries in scientific and technical matters to foreign S&T academies, industry, and government bodies; and helping to forge formal ties between local and foreign scientists and researchers and acting as catalysts for scientific exchange initiatives
- It was noted that countries are also conducting STI awareness programmes for diplomats and Ministries of Foreign Affairs and that Science Granting Councils, including NCST, are required by the nature of their mandates to play a critical role in science diplomacy.

- The meeting also noted that initiatives are underway to establish formal qualifications in research management and administration, at certificate and Master's level that will provide an opening for a PhD for SADC member states. This will provide opportunities to those wishing to build their capacity and pursue a professional career in this area.
- Most countries are able to collect statistics from R&D and Higher education institutions but face challenges with the business sector. In most countries sampling the business sector has been a major challenge because of the absence of a sample frame. Furthermore, the response rate was very poor, in most countries, because of mistrust and suspicions on the part of the business sector. The data collected was therefore not a true representation of the sector. As a result the GERD-for a number of countries was considered inaccurate because of the sampling problems.
- Most countries have formed in-country working teams together with national statistics offices to collect STI statistics. To enhance data collection, they also use e-mails and letters to data holding centres are signed by a responsible Minister. In some countries, like Ghana and Kenya, Science Granting Councils have taken over the responsibility of collecting STI statistics. To avoid data paralysis the analysed data is supposed to be accompanied by a narrative not just figures and statistics.
- Some countries like Kenya have established statistical offices in ministries, departments and agencies (MDAs) to enhance collection of STI data

National Contact point (NCP) training for researchers in Southern Africa Development Cooperation (SADC)

The European Commission's funding framework (Horizon 2020) offers funding for research and innovation for countries within the SADC region. Before disbursing the funds, the European Commission (EC), CAAST-Net Plus held a Horizon 2020 information session for researchers and potential beneficiaries of the funding and National Contact Points. The aim of the workshop was to give support and information on the EC's funding framework so as to increase their participation in the Horizon 2020. A total of 30 participants from science ministries and the research community, primarily from the Southern Africa Development Community (SADC) region, attended the workshop which took place at the Peermont Mondior Hotel, Gaborone, Botswana from 15-16 May 2017. NCST was represented at the meeting by Mr Mike Kachedwa and Mrs Gift Kadzamira.

IST-Africa Horizon 2020 Workshop

The National Commission for Science and Technology, as the IST-Africa Initiative partner in Malawi, organised the IST-Africa Horizon 2020 Workshop at Sunbird Lilongwe Hotel on 28 November 2016, in cooperation with IIMC (IST-Africa coordinator). The workshop specifically focused on ICT-39 International partnership building in low and middle-income countries Call with a deadline of 25 April 2017. The purpose of the workshop was to learn about Horizon 2020 as a research and innovation funding mechanism and specifically, to discuss opportunities for African organisations

involved in Research and Innovation under the ICT-39-2017 call and other relevant calls of collaborated proposal.

Mr Patrick Mphadzula from the Department of Science and Technology, representing the Secretary for Education Science and Technology, opened the Workshop and highlighted that the outcomes of the workshop would strengthen the research and innovation capacity of universities in Malawi, informing policy, supporting wider adoption of Open Innovation and ICT entrepreneurship and helping African research and innovation stakeholders attract funding under Horizon 2020.

Participants came from Chancellor College, University of Malawi (Computer Science Department, eLearning Centre), UbuntuNet Alliance, University of Malawi Polytechnic (CIT), Malawi University of Science and Technology (Department of Applied Studies, Department of Natural Resources, Department of ICT as a Service), Exploits University, D-Tree International, LUANAR (Department of Computer Science), Mzuzu University, College of Medicine (University of Malawi), National Commission for Science and Technology (Communication and Information Services Department, Documentation Department, IT Department), Kamuzu College of Nursing (University of Malawi), Ministry of Communications (e-Government Department), Ministry of Agriculture (Department of Agricultural Research, Chitedze Research Station), Ministry of Health, Ministry of Education Science and Technology and Ministry of Environmental Affairs.

IST –AFRICA 2017 Namibian Conference

The NCST Head of Documentation and Information Services, Gift Kadzamira, attended the IST – Africa 2017 Conference which was hosted by the Government of Namibia through the National Commission on Research, Science and Technology, and Supported by the European Commission and African Union Commission, from the 1st June - 02 June 2017. She presented a paper at the conference.



Figure 7: Opening Session of the IST Conference



Figure 8: Panelists pose for a group photo

Focusing on ICT-enabled Innovation, Science and Technology related policy dialogues, Global Development, Research and Innovation Cooperation and Community Building, the conference brought together senior representatives of leading public, private, education and research organizations from 50 countries to discuss policy, share insight and identify collaboration opportunities.

Cyber-security draft strategy validation

Developing countries, including Malawi are facing a number of cyber security challenges and threats some of which are:

- Lack of technical know-how (inability to monitor and defend national networks);
- Low level on security provisions;
- Limited lack of awareness
- Account Hijacking
- Data Loss
- System and application vulnerability

NCST formed part of a team that validated a Cyber-security draft strategy for Malawi. The gathering was brought together by MACRA in conjunction with Commonwealth Telecommunications Organization (CTO). Among other things, the team discussed that for this to be successful there is a need for full government support:

- Need to establish and enhance National Computer Experts Response Team (CERTs)
- Activate a culture of cyber security awareness
- Create a cyber-security awareness- sensitize relevant target groups about cyber security

Knowledge management

Establishment of a Technology and Innovation Support Centre (TISC)

NCST commenced the setting up and usage of a Technology and Innovation Support Centre (TISC) at its offices with support from the World Intellectual Property Organisation (WIPO) and Department of Registrar General. The TISC is aimed at performing the following roles:

- Offer search services for patent databases and other sources of technical information through direct personal assistance;
- Identify technical issues in terms of enterprises and research topics within universities and research institutes;
- Provide information on the state of the art in various technological fields;
- Take part in awareness-raising activities concerning industrial property rights in particular patents;
- Participate in the development of research results; and
- Identify technology transfer opportunities.

The NCST, has incorporated the initiative into its activities and services to ensure sustainability and visibility of the facility to the general public, students, technologists, SMEs, and other stakeholders interested in IP issues.



Figure 2: Technology and Innovation Support Centre within Lingadzi House

Management and review of PhD and Masters Research results from theses and dissertations of Government sponsored students

The NCST in collaboration with the Department of Human Resources Management and Development (DHRMD) embarked on the development of a database of theses and dissertations for government sponsored students. Malawi Government, through DHRMD, awards scholarships to public service personnel from Government Ministries, Departments and Agents (MDAs) to study for Master's or PhD programmes in various disciplines, at various universities in the country and abroad. About 40 students complete their studies in a given financial year (PhD and Masters). Upon their return some of the students have deposited copies of their dissertations or theses with DHRMD. Furthermore, DHRMD has observed that some of the students have done good research projects with good results and recommendations that can help Government solve some of the challenges the country is experiencing. However, DHRMD does not have a proper system for managing copies of the dissertations and theses, as a result nobody benefits from these useful publications. DHRMD, therefore recognizing the role of NCST, decided to engage the Commission on how Government can utilize results from research projects undertaken by the government sponsored students.

An agreement was therefore reached on possible archiving and review for implementation of research results from PhD and Masters' Theses and Dissertations of government sponsored students at a meeting organized by DHRMD and held at their offices at Capital Hill on 18th May 2017. The meeting further agreed that:

- DHRMD will be submitting to NCST, both hard and soft copies of students' research papers for review and possible referral to relevant institutions for implementation for the benefit of the country.
- Government through NCST will be taking up the recommendations and technologies contained in the research papers
- Authors of research papers would be invited to make presentations at National Research Dissemination Conference which is conducted once every two years
- Where necessary, officers from the commission shall be invited to make presentations during students pre-departure briefing on the role of the commission since students intending to do their research in Malawi involving human research participants would be required to obtain ethical clearance from the commission
- DHRMD will also amend the training bond and scholarship acceptance form to reflect the requirements by Government and donor funded Masters' and PhD students to be submitting their research papers to DHRMD for onward transmission to NCST

The commission was represented at the meeting by the Chief Documentation and Information services Officer, Mr Hambani Gausi and the Documentation Assistant Mr Thomas Kaluvi.

The Database of African Theses and Dissertations (Datad) Workshop 2017

Institutional repositories play a significant role in enhancing access and utilization of the research output for greater impact in Higher education institutions. The Association of African Universities, (AAU) which is headquartered in Accra, Ghana in collaboration with LUANAR organized an international workshop on Database of African Theses and Dissertations (DATAD) which took place at Crossroads Hotel in Lilongwe from 27 – 29 June 2017. The theme of the workshop was 'Rethinking Institutional Repositories for Knowledge Management in Higher Education Institutions' (HEI). The objectives of the training workshop were to:

- Strengthen the capacity of University libraries to manage and disseminate research output from faculty and students widely for greater impact
- Afford participants the platform to share experiences and learn about new trends in electronic content management

Countries that participated at the workshop included Rwanda, Nigeria, Ghana, Zimbabwe, Tanzania, Uganda and host country Malawi. The commission was represented by The Chief

Documentation and Information Services Officer, Mr Hambani Gausi and the IT Officer, Mr Mr Zacheous Kantchowa.

The workshop looked at Managing digital archives; how HEIs benefit from Institutional Repositories; What makes Institutional Repository initiatives fail?; Practical Session on setting up a repository using D-space; Managing faculty research findings for more impact; Top tools for tracking the usage of your IR; DATAD and its benefit for African HEIs; and Implementing URIs to make your repository more visible



Figure 3: Participants at the DATAD conference held at Crossroads Hotel, Malawi

Collection of Malawi policy documents for archiving in D-space, July 2016- June 2017

NCST collected over 100 hundred Malawi policy documents, both hard and soft copies. They were uploaded on the D-space. So far 60 documents were uploaded. The documents came from Government Ministries, Departments and Agencies websites. Next step will be visiting Government Ministries, Departments and Agencies for more policy documents. The exercise aims at enhancing access and utilization of national policy documents and also archiving them for country's repository.

Capacity Building

Training in Research Management

Members of NCST participated in a 2-day training workshop which was held from 28th to 29th October 2016 at Kamuzu College. The workshop was organised in collaboration with the Southern African Research and Innovation Management Association (SARIMA) with the aim of strengthening research and innovation management. SARIMA is a stakeholder organisation that provides a platform for the promotion and facilitation of best practice in research and innovation management in Southern Africa. Its purpose is to strengthen the research and innovation system to ensure the social and economic development of the Southern African region. The following members of NCST Secretariat participated in the workshop: Mr A. Muyepa, Director General; Mr M. Kachedwa, Chief Research Officer (Health, Social Science and Humanities); Mrs G. Kadzamira, Head of Documentation and Information Services; Mr K. Gondwe, Chief Planning Services Officer; Mr H. Gausi, Chief Documentation Officer; Mrs J. Elisa, Documentation Officer; Mr T. Kaluvi, Assistant Documentation Officer; and Miss M. Chimzimu, Research Officer (Health, Social Science and Humanities).

Training in Nanotechnology

NCST signed a Memorandum of Understanding (MoU) with the Bahgat Group of Companies of Egypt. The MoU was facilitated by COMESA and Malawi Investment and Trade Centre (MITC).



Figure 4: University lecturers who were selected to attend a 3 months course financed by Bahgat Group of companies in Egypt

The intention of the MOU was to establish a platform of cooperation in the fields of research and development, innovation and technology. The MoU enabled three young Malawians, namely Patricia Namate from Chancellor College, Esmie Mposa from Malawi University of Science and Technology and Maxwell Nyirenda from Lilongwe University of Agriculture and Natural Resources to undergo 3 month's training in Nanotechnology in Egypt in December 2016. Bahgat Group paid

for the full cost of the training including upkeep in Egypt, COMESA paid for Visa fees and NCST identified the trainees.

Malawi – Egyptian Scientific Collaboration secures four Scholarships to Malawians

NCST through its linkage with COMESA secured scholarships from Egyptian Government for undergraduate training in Pharmacy and Pharmaceutical Industries; Dentistry, Information Communication Technology and Computer Science at the Sinai University in Egypt. The Commission facilitated the identification of four Malawian students namely Chifundo Kansungwi, Bless Nthambo, Benjamin Oswald Sikanda. The students will commence their studies in the 2018/19 academic year. The Egyptian Government will find the students fully.



Figure 5: From right, Director General of NCST -Anthony Muyepa, The Egyptian Ambassador to Malawi – HE. Maher El-Adawy, Chifundo Kansungwi, Bless Nthambo, Benjamin Malema and Oswald Sikanda

WIPO Advanced training programme on Intellectual Property for Least Developed Countries

NCST was nominated to attend an advanced WIPO training programme on Intellectual Property for LDCs. On behalf of NCST, the Chief Planning Services Officer, Kondwani Gondwe was shortlisted and successfully completed the training programme which was in two phases. Course Phase and Application Phase/Follow up phase. The knowledge gained in this training will help him to promote use of IP services in Malawi especially for farmers according to his proposed research project entitled “Farmers Rights as an IPR issue-an inquiry into the status quo.”



Figure 6: Participants from LDCs who attended training programme

This research carried out by Kondwani Gondwe, an Economist and Carol Makoko, a legal practitioner investigated why farmers' rights have continually been left out of the policy and legal framework in Malawi in a hope to hold-off further prolonged non-recognition and to eventually map an avenue for a systemic approach for the recognition, realization and protection of farmers' rights in the long run. The study also attempts to explore the utilization of the Technology Innovation Support Centres (TISCs) platform for sharing the research findings through publication of booklets from the study. The authors further provide recommendations that are aimed at eventual mapping of avenues for a systematic approach for the recognition, realization and protection of farmers' rights.

A summary of the key findings indicate that farmers' rights have continually been left out of the policy and legal framework in Malawi due to (i) lack of awareness of farmers' rights and high illiteracy levels on the part of the farmers' making it difficult for them to push for their rights, (ii) lack of political will for the inclusion of farmers' rights, (iii) weak farmers' union organisation and (iv) competing interests between the formal and informal seed sectors in the country. The legislative and policy sphere and its dynamics have further wrecked the inclusion of farmers' rights because of the capacity challenges for regulators, adverse economic climate, overemphasis on the formal seed sector and multi-national seed companies then the farmers and the continued refusal to recognize farmers as plant breeders.



Awareness:

There is no awareness on the part of the farmers on IP issues



High Illiteracy Levels:

This makes it difficult for the farmers to understand their rights



Weak Farmers' Union Organizations:

These would help counter the dominance of Multi-National Seed companies



Lack of Political Will:

To include Farmers' Rights for fear that once done, farmers will have basis to claim their entitlements.



Competing Interests and Exploitative Players in the Industry:

Imbalance between the formal seed sector and the informal seed sector

On a more brighter note, farmers' rights continues to be a debatable issue in the country considering the fact that it is very clear that there are misunderstandings and lack of understanding of what farmers' rights really are and more so as regards to its relation to IP rights. The study notes that there are bodies from the civil society who are currently lobbying for farmers' rights as noted from the initiatives taken by some, which among others, includes engagement of both the Parliamentary Committee on Agriculture and the Ministry of Agriculture to consider inclusion of farmers' rights into the Draft National Seed Policy. The authors finally recommend that:

- Stakeholders need to move away from looking at farmers' rights as a controversial issue and embrace the idea of protecting the interests of farmers' in the country through legislative recognition.
- The stakeholders may consider carefully selecting and adapting some IP tools and IPRs to suit domestic circumstances some sort of *sui-generis* regime for the protection of farmers' rights.
- Lessons can be drawn from the Swakopmund Protocol and the African Model Law as a means of putting into perspective the *sui-generis* system
- Achieving reconciliation of farmers' rights and IPRs through plant variety protection legislations that try to balance the interests of commercial breeders, of traditional farmers and the global interest in plant genetic resource conservation
- Individually drafted plant variety protection legislations that incorporate farmers' rights are more appropriate
- The stakeholders can learn lessons from India and other countries that have achieved the recognition and protection of farmers' rights. India particularly, achieved this by the inclusion of farmers' rights provisions in a plant breeders' rights legislation. In the same

way Malawi has a Plant Breeders' Rights bill that has been in draft form since 2007, perhaps the stakeholders can lobby for inclusion of farmers' rights.

In conclusion, there is hope that the findings of this research will go a long way in educating masses especially farmers and also hold-off further prolonged non-recognition and eventually map an avenue for a systemic approach for the recognition, realization and protection of farmers' rights.

Information and Communication Technology

Malawi critical information infrastructure protection workshop

NCST participated in a workshop on protection of Malawi's critical information infrastructure that was organized by MACRA in conjunction with Commonwealth Telecommunications Organization (CTO) from 19th to 20th June 2017 at Crossroads Hotel in Lilongwe. The Commission was represented by Hambani Gausi and Zacheus Kantchowa.

The workshop which was officially opened by MACRA's Deputy Director General, Mr. F. Bisika identified the following as constituting Malawi's critical infrastructure: Energy, ICT, Tourism, Finance and Banking, Mining, Manufacturing & Industry, Defense & Security, Transport, Government, Research & Development, Water, Health, and Food & Agriculture. Stakeholders that participated at the meeting included, the academia, the Police, the Judiciary, NCST, ICT Association of Malawi, e-Government Department, Banks, Malawi Defence Force, Internet Service Providers and other government departments.

Web based Online Public Access Catalogue (OPAC)

NCST continued entering bibliographic data regarding information resources found in the NCST's library into a web-based database called Library-thing. The aim of the exercise is to develop an online catalogue for accessing publications in the NCST library. Over 1853 titles have been added. The OPAC can now be accessed through the NCST website under Resources drop down menu.

Databases and Digital Repository (D-Space) training

NCST worked on the restructuring of, and populated the databases on Research Projects and Researchers' profiles in D-space and MySQL; NCST collected data for the S&T institutions database from institutions in central region, from 25-27 April 2017. Questionnaires were sent to Science and Technology institutions in Central Region and later the Documentation Assistant physically visited the institutions to collect completed questionnaires. The aim of the exercise was to update the current S&T directory which was published in 2012.

The ICT Officer, Mr Zachaous Kantchowa attended D-space training which took place at LUANAR. The training helped Secretariat to configure D-space which can be accessed by visiting the link: 192.168.3.13:8080/xmlui.

Installing and customizing D-space on a Linux server

D-Space, a digital repository system, was installed on a Linux server. The D-space can be accessed by visiting www.ncst.mw/dspace

Upgrading Webserver (Linux server).

Webserver was upgraded from Ubuntu Server version 14.0 to Ubuntu server version 16.04 in order to make sure that it can support the latest technologies that are coming up, and to make sure that the web server is well secured with the current latest security updates.

Setting up Online R&D Survey

Malawi lacks reliable science, technology and innovation data. In order to provide a solution to the current data challenges, NCST is introducing innovations in data synthesis and collection and it managed to set-up an online test survey. If this On-line tool is going to be successful, it can be used for enhancing data collection for different types of data including Research and Development; Bibliometrics; Innovation activities and other. The online test survey can be accessed on www.ncst.mw/surveys. This innovation is jointly championed by the Planning and ICT departments of NCST.

Cyber Security Capacity Building Workshop

A team of officers comprising, Mr. Prosper Mopiwa, Deputy Director and Mr. Timothy Nuka, Principal Systems Analyst from the Department of e-government; Mr. Khumbo Kasambara and Mr. Gabriel Ali, ICT Officers from MACRA; and Mr. Hambani Gausi, Chief Documentation and Information Services Officer from NCST, participated at a cyber-security capacity building workshop which was held in Tel Aviv, Israel from 28th January to 4th February 2017. The workshop was organized by the World Bank in partnership with the Government of Israel. The knowledge gained will help in preparation of the national cyber-security strategy.

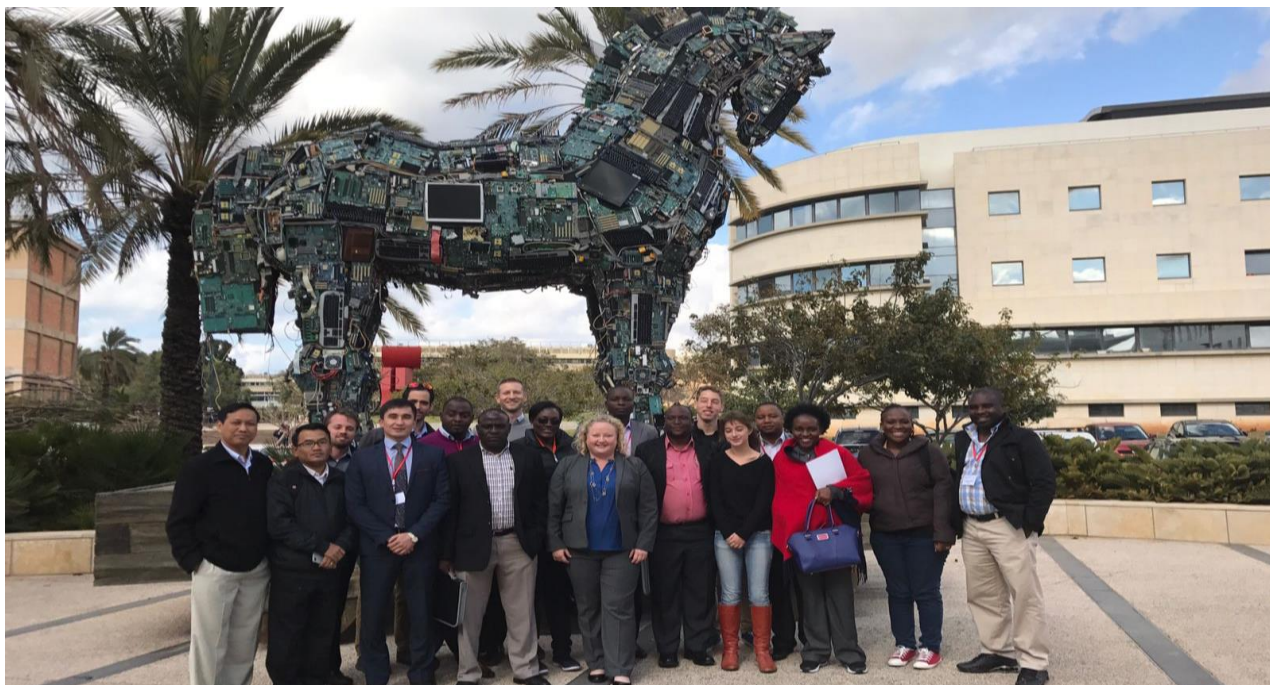


Figure 9: Cyber security meeting held in Tel-Aviv from 28th January to 4th February 2017

Research Regulation

Sensitization on Procedures and Guidelines for Access and Collection of Genetic Resources

Sensitization of stakeholders involved in the collection of genetic resources (GR) on how they can grant permission to researchers is critical in Malawi. Most of these stakeholders are not aware of procedures regarding collection of samples of GR for research. A meeting on Procedures and Guidelines for Access and Collection of Genetic Resources in Malawi took place at Gantt Executive Lodge, Salima on 19th April 2017. NCST organised the meeting to sensitize stakeholders on the following:

- a) Approval process for access and collection of genetic resources for research
- b) Role of affiliating institutions during research
- c) Procedures to be followed for exporting genetic resources
- d) Conservation challenges of genetic resources in Malawi

Some of the research applications that required use of Genetic Resources during the period are listed below:

Title
Reduced environmental pesticide load in sugarcane production through introduction of new integrated pest management strategies in a changing climate
Malawi cichlid fish genomics and fisheries-induced evolution"
The Evolutionary relationships of clawless otters

Plant Herbivore interactions in Savanna ecosystems and resource partitioning among large mammal herbivores at the scale of the African continent
Increasing access to biodiversity information through development of a national database and public participation
Strengthening the national plant biodiversity information facility, national herbarium and botanic gardens, Malawi
Biodiversity Information Mobilization in Liwonde Forest Reserve
Enhancing Biodiversity Information of the Malawi Indigenous Sheep Ecotypes
Status and spatial diversity of Sorghum wild species in Malawi

Table 1: Selected Research Protocols involving use of GR in Malawi

It is anticipated that NCST will continue to sensitize its stakeholders to ensure that the genetic resources in the country are not over-exploited due to lack of proper procedures. Proper care of our genetic resources is required to ensure longevity of the species of plants and animals for the benefit of the future generations.

NCRSH Protocol Reviews

A total of 78 proposals were reviewed of which 73 were approved by the National Committee on Research in the Social Sciences and Humanities (NCRSH). The committee convened meetings in August 2016, November 2016, January 2017, April 2017 and June 2017 to review proposals. The idea is to ensure that ethical, scientific and regulatory issues identified in research are addressed before commencement of research work. Full details of the protocols can be obtained from the relevant department at NCST offices.

Training for National Committee on Bioethics

NCST organised a second training for the National Committee on Bioethics (NACOB) and its stakeholders on 22-26 May 2017 at Bingu International Convention Centre (BICC) in Malawi. The training, which was supported by UNESCO, was facilitated by experts from the Centre of Bioethics at Dublin City University, Stellenbosch University and NACOB leadership. The training was aimed at providing an introduction into the fundamental principles of bioethics and their application in various circumstances and practices. The goal of the training was to equip the participants with skills to enable them to identify ethical issues.



Figure 10: Bioethics Training Participants

The event was spiced by a Live Panel Discussion on Zodiak Radio on 25th May 2017 focussing on general matters of bioethics. The panel discussion involved a panel of experts, NACOB chair and NCST Director General. It was attended by members of the press, invited members of the public including civil society organisations and members of NACOB. Members of the general public were able to comment and pose questions to the panel of experts to which answers were provided. The panel discussion was conducted in Chichewa and English.

The training will benefit Malawians as the training is expected, particularly to give the participants skills-set that will allow them to:

- Provide rational justification for ethical analysis, advice and recommendations; and
- Apply the ethical principles of the Universal Declaration on Bioethics and Human Rights, thus strengthening the basis and relevance of the work of the newly established NACOB.

Energy Research

National Cook Stove Committee Meeting

NCST, as a member of the National Cook Stove Steering Committee participated in the National Cook Stove Committee meetings held on 22nd September 2016, in Lilongwe (GIZ Country Office). During the meeting an update of the National Cookstove Steering Committee activities was provided including lobbying for the removal of VAT on cookstoves and import duty on imported

cookstove components as well as planning for the 2017 cookstove camp, database for cookstove production groups, their locations, marketers and other players; and the number of cookstoves sold to-date.

Total LandCare (TLC) made a presentation on the learning of lessons from the Irish AID funded Lilongwe City Stoves Project. The project has developed a sustainable fuel wood pilot supply chain originating in rural villages 20-50 km from Lilongwe and delivering to high density urban centers. Farmers are selling fuel wood (from sustainable sources - farmers are planting trees in own woodlots from where they harvest excess wood for sale) to the residents of the city through TLC at a guaranteed price. TLC has one warehouse and selling points in three locations within the city from where people are able to buy the fuel wood. TLC has a vehicle which collects the wood from the catchment area – currently Malingunde.

The National Charcoal Strategy Task force made a presentation on the draft Malawi Charcoal Strategy. The development of the Malawi Charcoal Strategy is being supported by Protecting Ecosystems and Restoring Forests in Malawi (PERFORM), a USAID-funded project. Members were asked to submit their comments to the draft and the Section will therefore submit comments to the same. In addition, NCST is expected to contribute to the draft Renewable Energy Strategy which has been circulated by the Department of Energy Affairs.

The Clean Cookstove Camp

As a member of the National Cook Stove Steering Committee, NCST participated in the Clean Cookstove Camp which is an annual event aimed at showcasing clean cookstoves and cooking technologies. The camp was held from 6 – 8th June 2017 at Sol Farm, Lilongwe. The camp included presentations, demonstrations and discussions. Some of the topics covered were:

- Update - where we are on our way towards 2 million cookstoves until 2020;
- Update to the Malawi Energy Strategy – what is the content on cookstoves and what is the status of the strategy;
- How to increase production capacity while maintaining quality standards at the same time;
- Household cooking on charcoal or wood - Comparison of the energy consumption and health implications;
- Making the stoves desirable: learnings from other sectors and products;
- Increase adoption of improved cookstoves through the use of social marketing and behavioural change communications;
- Update on ISO standards by National Commission for Science and Technology (NCST);
- Consumer choice and the willingness to pay for improved cookstoves in Malawi: A case of Chiradzulu District; and
- Investigating the significance of biomass fuel use and role of improved cooking technologies to mitigate environment and social impacts in Malawi.

'Thawale Cookstove' and 'Chitetezo cookstove' were among the clean cookstoves exhibited at the camp. These clean cookstoves have the potential to reduce depletion of Malawi's forest cover.



Figure 11: Some of the showcased cookstoves - Thawale Cookstove (far on the left) and Chitetezo Mbaula (right)

Contribution to the development of ISO Standards for Improved Cookstoves

At the Clean Cookstove Camp, NCST continued to participate in the ISO/ TC 285 for the development of International Standards for Improved Cookstoves and Clean Cooking Technologies. In this regard, NCST made a presentation on the process of ISO standards Clean Cookstoves and Cooking technologies.

Scope: Standardization in the field of cook stoves and clean cooking solutions.

ISO work program (work in progress)

- ISO NP 19867, Clean cook stoves and clean cooking solutions – Harmonized laboratory test protocols
- ISO NP 19868, Clean cook stoves and clean cooking solutions – A conceptual framework for cook stove testing protocols and performance indicators
- ISO NP 19869, Clean cook stoves and clean cooking solutions – Guidance of field testing methods for cook stoves
- ISO NP 19915, Clean cook stoves and clean cooking solutions – Guidance for social impact assessment

This process is locally led by Malawi Bureau of Standards. The process is mainly undertaken remotely and sometimes face to face meetings.

Workshop on Low Sulphur Fuels, Clean and Efficient Vehicles

It is evident that high levels of sulphur, particularly in diesel fuels have major impacts on health, vehicle performance and the environment. During the reporting period, NCST participated in the Low Sulphur Fuels, Clean and Efficient Vehicles Workshop which was organized by the Department of Energy Affairs with support from the United Nations Environment Programme (UNEP). The workshop was held on 11 - 12th May, 2017 in Blantyre at the Ryalls Hotel and it attracted international participants from UNEP (Nairobi), Mozambique and South Africa. The main objective

of the workshop was to develop a roadmap for implementation of low sulphur fuels for Malawi and neighbouring countries.



Figure 12: Group Photograph – Low Sulphur Fuels, Clean and Efficient Vehicles Workshop

The workshop involved presentations and discussions on the different topics such as cleaner fuels, cleaner and efficient vehicles. The topics covered included: Environmental and health benefits of low sulphur fuels; Global trends in sulphur reduction; Sub-regional fuel quality standards; National and regional activities to promote cleaner fuel standards; National fuel quality improvements in Malawi; International trends to reduce vehicle emissions and improve vehicle fuel efficiency; Vehicle population and growth rates; Promoting cleaner and efficient vehicles; Fiscal incentives to promote cleaner vehicles; Reducing vehicle emissions in Malawi; and Promoting efficient public transportation. NCST represented by Fredrick Munthali and the Polytechnic made a presentation at the workshop on reducing vehicle emissions in Malawi.

At the end of the workshop, the participants developed a roadmap for the implementation of low sulphur fuels for Malawi.

Inception Workshop on the Energy Transitions and Regional Climate Change in East and Southern Africa's Coupled Human, Terrestrial, and Atmospheric Systems

NCST participated in the inception workshop for the project on Energy transitions and regional climate change in East and Southern Africa's coupled human, terrestrial and atmospheric systems. The workshop took place on 20th June 2017 in Lilongwe. The project is implemented by the Centre for Agricultural Research and Development (CARD) at Lilongwe University of Agriculture and Natural Resources (LUANAR) in collaboration with the University of North Carolina (UNC) at Chapel Hill in the United States of America with funding from National Science Foundation of the United States of America. The overall goal of this project is to investigate linkages between the use of biomass and its impacts on human, terrestrial, and atmospheric systems. Pam Jagger and colleagues Jason West (GSGPH, UNC), Andy Grieshop (NSCU), and Rob Bailis (Stockholm

Environment Institute), in collaboration with Drs. Charles Jumbe and Thabbie Chilongo at the Lilongwe University of Agriculture and Natural Resources (LUANAR) in Malawi have been awarded a Coupled Natural Human (CNH) Systems grant from the National Science Foundation to investigate linkages between the use of biomass in Southern Africa and its coupled impacts on human, terrestrial, and atmospheric systems.

Likoma Electrification Workshop

NCST participated in the workshop for the electrification of Likoma and Chizumulu Islands on Lake Malawi. The workshop was organized by the Department of Energy Affairs and was held on 1st July 2016 in Salima. The workshop was convened to search for alternative, effective, efficient and sustainable ways of electrifying Likoma and Chizumulu Islands to replace the current diesel powered electricity supply. The workshop reviewed the findings of the feasibility study for the electrification of the islands undertaken by Dr. Collen Zalengera of Mzuzu University. The study assessed the technical, economic and environmental feasibility of using alternative solar energy for the supply electricity to the two islands. The workshop concluded that solar is feasible alternative for the supply of electricity to the two islands and recommended that further work be carried out building on the findings from the previous study.

Training on the Solar Resources Mapping for Malawi

NCST participated in the technical training on the solar resources mapping for Malawi to support the development of renewable energy in the country. The training was organized by the Department of Energy Affairs (DEA) with support from the World Bank and was held in Lilongwe on 27th September, in Lilongwe. The main topics covered during the training were: how the solar data affects the development of photovoltaic power plants; understanding PV power production and its evaluation; solar resource assessment; and solar meteorological stations in the development and operation of solar power plants. The training provided adequate resource materials for future programming and utilization.

Intellectual Property (IP)

World Intellectual Property Day and Roving Seminar on IP

NCST participated at a World Intellectual Property Day at the US Embassy's Public Affairs Section Auditorium organized by COSOMA, 26 April 2017. The Embassy showed the National Geographic Documentary Illicit with the goal of helping young people better understand the dangers of buying and selling pirated/ counterfeit materials. The other activity was panel discussion involving young

creators in the likes of Q Malewezi, Mandela Mwanza and Lilly Alfonso as well as the IP offices, COSOMA and Registrar General on the understanding of Intellectual Property in Malawi. The function was aimed at sensitizing the public on the importance of observation of Intellectual Property.

In addition, NCST attended a National Roving Seminar on Fostering Creativity and Innovation for Economic Growth and Development in Africa which was organised by African Region Intellectual Property Rights (ARIPO) and Registrar General (RG) and held in Blantyre and Lilongwe. The Head of Documentation and Information Services attended the Blantyre meeting and CPSO attended the Lilongwe meeting. Participants learned that under the Swakopmund Protocol, Malawi has an obligation to set up a National Competent Authority (NCA) to administer traditional knowledge within the context of intellectual property rights. It was agreed that the two bodies (Registrar General and Copyright Society of Malawi) will be the NCA and the NCST was identified as one of the members of the Steering Committee.

STI Planning

Stakeholders' consultations on the new NCST Strategic Plan 2017-2022

NCST with support from the independent facilitators from Chancellor College-Statistics Department and Department of Human Resource Development conducted stakeholder consultations during the first week of November 2016 to identify issues for consideration in the successor Strategic Plan. The Stakeholders' Consultation Report informed the Commission on views of stakeholders regarding strategies, collaborations, impact areas and targets for the new strategy.

Drafting and Review Sessions

A number of drafting and review sessions for the strategic plan were organised. The draft strategic plan was reviewed by NCST staff members, stakeholders, and members of NCST's Scientific and Awards Committee (SAC); and Finance, Audit and Administration Committee (FiAAC) prior to approval by the Board.



Figure 13: The Strategic Plan and the NCST Team behind the development of the Plan

Technology, Innovation and Entrepreneurship in Africa

NCST participated in an Executive Training Program organized by Harvard Kennedy School in Cambridge, Massachusetts in the United States of America from 5th to 7th December 2016. The program convened teams of senior leaders from across the African continent on Harvard's campus to address the critical challenges facing their economies. Several countries that participated were Burkina Faso, Ethiopia, Burkina Faso, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Uganda, South Africa (represented by New Partnership for Africa's Development – NEPAD) and Sierra Leone. Malawi was represented by NCST Secretariat and the team was composed of the Mr A. Muyepa, Director General; Mr F. Munthali, Chief Research Services Officer (Energy, Engineering and Industrial), Mrs G. Kadzamira, Director of Documentation and Information Services; and Mr K. Gondwe, Chief Planning Services Officer.

The objective of this three day problem-focused Technology, Innovation and Entrepreneurship in Africa (TIE) program was to provide African leaders with the strategic tools needed to implement innovation strategies. The curriculum was based on issues identified by program participants, with emphasis placed on the themes covered in the Science, Technology, and Innovation Strategy for Africa, 2024 (STISA-2024) adopted by the African Union in 2014.

The team from Malawi made a proposal which was presented to Harvard Kennedy School of Government for funding consideration, although the organizers stated that they wanted participating countries to fund these initiatives from their annual appropriated budgets.

Public Sector Investment Programme Ministerial Meeting

NCST participated in the Public Sector Investment Programme (PSIP) Ministerial Meeting that was held on the 15th December, 2016. NCST Secretariat was represented by Mr F. Munthali, Chief Research Officer (Energy, Industrial and Engineering); and Mr A. Manda, Director of Planning. The meeting was organised by the Department of Economic Planning and Development as part of the consultation process with stakeholders regarding financing of public projects. Discussions focussed on the Multi-Purpose Science, Technology and Innovation Infrastructure Project. As before, the issue of land for the project was seen as a stumbling block to progress on this project.

Disaster Early Warning Systems Workshop

NCST participated in a workshop for the disaster early warning systems in Malawi. The workshop was organised by Department of Climate Change and Meteorological Services in collaboration with LEAD, CEPA and Christian Aid. The workshop was held in Lilongwe on 10th – 11th August, 2016. The workshop reviewed disaster early warning system in Malawi with the aim of contributing to disaster risk management through an effective and vibrant early warning system to reduce disaster risks and damage in all sectors in Malawi.

The workshop reviewed the Disaster Early Warning System as being made up of four interrelated elements, 1) Risk Knowledge, 2) Monitoring and Warning services, 3) Dissemination and Communication, and 4) Response Capacity, and that each element must be effective and vibrant for the whole system to effectively generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

Environmental Research

Ratification of the ban amendment to the Basel Convention

NCST attended a workshop on the ratification of the ban amendment to the Basel Convention. The workshop was held 19-20 December 2016 at Sunbird Livingstonia Hotel, Salima and NCST Secretariat was represented by Mr L. Kampira, Chief Research Officer (Agriculture and Natural Sciences) at the workshop. Basel Convention is an international treaty that was designed to reduce the movements of hazardous wastes between nations, and specifically to prevent transfer of hazardous waste from developed to least developed countries.

The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. Due to a deficiency in the Basel Convention legal framework, there was need to have an amendment to it so that the least developed countries are better protected from the hazardous wastes. This amendment is termed “Ban Amendment”. The

Environmental Affairs Department (EAD) as National Designated Authority in Malawi in the control of hazardous waste, is undertaking a process of consulting national stakeholders on the ratification of “Ban Amendment”. In this regard the EAD organized a national multi-stakeholder workshop with the aim of raising awareness on the ratification of the Ban Amendment under the Basel Convention and the implementation of the Basel Convention in general.

Faecal Sludge Management and Sanitation Planning Workshop

NCST participated in the faecal Sludge Management and Sanitation Planning Workshop from 4-5th May, 2017 which was held at the Polytechnic in Blantyre. The workshop was organized by the Polytechnic - Centre for Water, Sanitation, Health & Appropriate Technology Development (WASHTED) and Eawag – Sandec of Switzerland.



Figure 14: Participants visit a faecal sludge treatment research site at the Polytechnic

The workshop brought together international and local experts and researchers to share the latest approaches and technologies for sanitation planning learning more about the newest approaches and technologies for achieving universal sanitation. The workshop therefore provided participants the opportunity for the development of new skills and approaches in the development and implementation of waste management and sanitation projects. The workshop involved presentations, group work, case studies, exercises and demonstrations. The main topics that were covered during the workshop were:

- Sanitation planning for rural and urban areas.
- Introduction to Sanitation 21, CLUES and Sanitation Safety Plans;
- Sanitation options: technologies for collection and transport and technologies treatment and use

- Quantification and characterization of faecal sludge;
- Treatment and reuse of faecal sludge;
- Introduction to Case studies, group work assignment (Dakar, Khulna, Kampala)
- Social and financial issues with emptying and treatment of faecal sludge; and
- Health and microbiology of faecal sludge.

Public Understanding of Science and Technology

Sensitization Meetings for the 2017 Schools Science Fair

Sensitization meetings for the national schools science fair were held from 3rd to 7th April 2017. The NCST made its financial contribution amounting to K1,860,000 which was mainly used to cover costs towards the sensitization meetings and media related costs.

Career Mentoring Sessions

NCST established Women in Science and Technology Network (WISTNET) to promote a culture of science among girls and also demystify the popular myths in science. A member of WISTNET from Mzuzu University, Dr. Margaret Mdolo conducted career mentoring sessions at different schools in the northern region from 30th January to 3rd February 2017 at Katoto Secondary School, Mary Mount Secondary School, Mzuzu Government Secondary School and Chibavi Community Day Secondary School. Over 1000 students were directly reached out. Furthermore, the activity was extensively covered by media, implying that more students were indirectly reached out.

Science Awards

2016 AU-TWAS Young Scientist Award

NCST received communication from the World Academy of Sciences (TWAS) and widely circulated the Call for applications to researchers in the country for the 2016 Young Scientist National Award. The Award which seeks to recognize scientific excellence among young researchers (40 years below) is run by African Union, managed by the World Academy of Sciences in Italy and locally managed by the National Commission for Science and Technology.

The 2017 Egypt Academy of Scientific Research and Technology Young African Researchers Award

NCST facilitated the nomination of Dr. Fanuel Lampiao of College of Medicine and Dr. Limbikani Matumba of LUANAR for consideration under the Young African Researchers Award by the Egypt Academy of Scientific Research and Technology. It was the first time for Malawi Government to be invited to send nominees for this award.

Ongoing Projects

The following ongoing projects registered some progress during the reporting period July 2016 to June 2017.

RLEEP Funded Solar – Wind Hybrid Milk Cooling Facility Project

The objective of the project was to develop a cheap solar/wind powered milk cooling system as an alternative to diesel generator powered milk cooling systems and as back-up to grid electricity powered milk cooling systems in Matapwata EPA in Thyolo District. The project is expected to benefit about 600 dairy farmers. Below is the status of the project as of 30th June 2017.

Following a request to RLEEP for additional funding, a “No Objection” was granted by the financiers (IFAD) to increase the funding by MK10,000,000. However, it was required that the Program Steering Committee (PSC) ratify the revision and a revised budget was therefore prepared and submitted to RLEEP in October 2015 for review by the Technical Committee and Program Steering Committee.

Materials for the solar system were delivered during the period. However, the wind turbine system and accessories were not delivered until after the closure of the project. The Project Team undertook a visit to the project site (Bvumbwe) from 23rd – 25th May 2017 to inspect and assess the newly constructed bulking group building and to determine the technical requirements for the installation of the solar system. Installation works of the solar panels, battery cage and accessories was done during the first week of June 2017. However, it was noted that one of the inverters was not compatible with the other two (all the inverters are supposed to communicate with one another) as such it was returned to the supplier for replacement.



Figure 15: Solar and Wind turbine installations at Nantchefu Milk Bulking Group with funding from RLEEP

Baseline Study on Waste Composition & Greenhouse Gases Emissions in Lilongwe City

NCST undertook a baseline study on waste characterisation and greenhouse gases (GHGs) emissions in the City of Lilongwe in response to a call from Lilongwe City Council and Environmental Affairs Department. The draft final report was produced and sent to the client for further comments. The Client organized a validation workshop which was held on 5th September, 2016 in Salima. The results of the project were presented to stakeholders for their comments and input. Upon incorporation of stakeholders' comments the report was finalized and submitted to the client. The major finding was that waste generation rate is determined to be 0.493 kg/capita/day, meaning 1 person is currently generating 0.493 kg/day equivalent to 180 kg/year. Estimates of quantities of waste generated in Lilongwe City is shown below:

Waste Category	Quantity(kg) per week	Average Quantity(kg/ day)	Bulk Density (Kgs/m ³)
Residential Curb-side	43,720	8,740	506.6
Commercial	19,010	3,800	292.6
Hospital	11,480	2,300	1,038.1
Mixed (Commercial, HH & Hospital)	33,310	6,660	523.3
Market	58,470	11,690	383.2
Self-haul	1,050	210	108.9
Industrial	50,400	10,080	601.0
Sub -Total	217,440	43,490	460.6
Special Collection	226,540		710.3
Special Collection	317,160	870	
Grand Total	443,980	44,360	561.3

Table 2: Waste production in the city of Lilongwe

Traditional Medicine Research Project

The purpose of the project is to promote traditional medicine research as it relates to finding treatment for HIV/AIDS opportunistic infections. The project is funded by the National AIDS Commission and co-ordinated by NCST and the participating institutions in the project include: College of Medicine, Chancellor College, Forestry Research Institute of Malawi, National Herbarium and Botanic Gardens of Malawi, Bunda College and Malawi Traditional Healers Umbrella Organisation.

During the reporting period, NCST facilitated the procurement of reagents and gases for use in the conduct of laboratory experiments at the Chemistry Lab at Chancellor College (UNIMA) where Gas Chromatograph machine and other similar pieces equipment that were bought under the project were installed for research and education. After investing heavily in equipment, the project is expected to run the planned experiments at Chancellor College.

Submission of Proposals for GBIF Funding

As a focal point for Global Biodiversity Information Facility (GBIF), Secretariat reviewed and recommended for funding under the GBIF the following proposals:

No.	Proposal title	Institution
1	Increasing access to biodiversity information through development of a national database and public participation	Museum of Malawi
2	Strengthening the national plant biodiversity information facility, national herbarium and botanic gardens, Malawi	National Herbarium and Botanic Gardens of Malawi (NHBGM)
3	Status and spatial diversity of Sorghum wild species in Malawi	Malawi Plant Genetic Resources Centre (MPGRC) at DARS

Program for Biosafety Systems (PBS)

The overall goal of the PBS/Malawi program continues to be the development and implementation of a fully functional biosafety regulatory framework, as guided by the National Biotechnology and Biosafety Policy (NBBP), and to establish a robust mechanism for the provision of effective communication and outreach services. In view of the overall goal for PBS/Malawi, the strategic objectives focus on:

- i. Development of a fully functional regulatory biosafety framework for managing GMO applications, review procedures and environmental releases in field trials and in farmers' fields;
- ii. Strengthening capacity and skills with biosafety regulatory authorities;

- iii. Increasing understanding of modern biotechnology and biosafety.

The following outputs were accomplished during the financial year ending 2017:

Bunchy top virus resistant Banana trials

Three members of staff from PBS/NCST Coordination Unit in collaboration with the Biosafety Registrar's office supervised planting of Virus Resistant Banana. The function took place at Mkondezi Agricultural Research Station, Nkhata Bay on 27th July 2016. The main objective of the trip was to verify that planting of the plantlets were compliant to terms and conditions stipulated in the CFT permit. The research Team was represented by experts from Queensland University of Technology, Australia and supported by a team of experts from DARS. Banana is a very important food crop for Malawi and is among the easily accessible fruits available. However, recently entire plantations of banana have been wiped out due to the problem of Banana bunchy top virus which has affected many parts of the country that grow banana.



Figure 16: GM banana plants CFT



Figure 17: The CFT Field with a wire fence for protection

Finalization of Biotech Information, Education and Communication (IEC) draft messages

Three documents on biotechnology materials meant for public sensitization were critically reviewed and recommendations made on 17th and 18 August 2016 at Bay View Lodge in Salima by experts from selected key institutions. Participants to the meeting were from MoA Extension services, LUANAR, Chancellor College, EAD, DARS, NCST and Monsanto. The documents reviewed were: Cowpea productivity improvement; Guarding against Maruca Infestation; and Frequently Asked Questions.

Bt cowpea and Socioeconomic Impact Study on Bt Cowpea

LUANAR in collaboration with AATF and PBS continued to conduct confined field trial of Bt cowpea at Bunda College. 2016/17 was the second year of Bt Cowpea confined field trials at LUANAR were completed. The research team is analyzing the data. The purpose of the study is to assess the efficacy of the Bt cowpea in controlling insect (Maruca) infestation. To address potential concerns regarding the social and economic impact of GM cowpea adoption and commercialization in the country, PBS through NCST wants to commission a Social and Economic ex-ante Impact Assessment for GM cowpea in Malawi. The objective of the study is to assess the potential economic and social impression of the adoption of Bt cowpea.

National Performance Trials for Bt Cotton

NCST arranged visits by various local institutions and two international visitors (from COMESA and Kenya) to National Performance Trial Sites for Bt Cotton on 'Seeing is believing tours'. The institutions that visited the sites included Cotton Council of Malawi (CCM), National Biosafety Regulatory Committee, Cotton Council of Malawi, National Biosafety Regulatory Committee, Cotton Growers Association, Ginners, and Farmers Union of Malawi. The visitors were very impressed with effectiveness of the Bt trait in managing bollworm infestation compared to conventional cotton.

Cotton Industry Consultations

NCST in collaboration with CCM convened a consultative meeting of the cotton industry at Livingstonia Beach Hotel from 15th to 16th June 2017. The meeting was organized following significant progress that the Bt cotton research programme was making towards commercialization. The meeting discussed issues of seed pricing, lint quality, pest resistance and co-existence. The meeting was facilitated by PBS international experts, John Komen, Rashmi Nair, and a farmer from India Ravichandrani. National experts included Prof Bokosi, Jesse Mvula and Ketulo Salipira. Experts from Monsanto and Mahyco were also present to share their experiences.

Variety Registration Application for Bt cotton

During the reporting period, PBS Coordination unit has been continuously engaging with public as well as private sectors on clearing the way for the submission of Variety Registration trials for Bt cotton. These efforts have been successful as Variety Registration application was presented to DARS annual meeting on 23rd September 2016. The application has been approved. DARS and Quton will jointly be conducting the trials beginning this year.

Assessment of Solar Drying for Reducing Post-Harvest Losses in Maize – A Case of Rural Smallholder Farmers in Malawi, Zambia and Mozambique

NCST in collaboration with Mzuzu University and University of Zambia (UNIZA) developed a full project proposal which was submitted to the Agricultural Productivity Programme for Southern Africa (APPSA) on 25th August, 2016 for funding consideration. The full proposal was developed following the acceptance of the project concept which was submitted in response to a call for project concepts. The project will be implemented in Malawi and Zambia for three years from 2016 – 2019. The Malawi component has an approved budget of US\$149,937.00.

The goal of the project is to enhance food security through reduction of postharvest losses in both countries. The overall objective of the project is to assess solar drying technologies for maize in order to reduce maize postharvest losses under rain fed and irrigation farming in two selected districts in each country.

Specific objectives of the project are to:

- develop solar drying technologies for maize suitable for the selected areas;
- assess the performance of the solar drying technologies in relation to conventional direct sun drying;
- assess the effect of solar drying on the prevalence of mycotoxins in maize; and
- evaluate the economic feasibility of the solar drying technologies for maize in the selected areas

Start-up activities for the project in Malawi were isolated in February 2017 as follows:

- identification of project sites through District Agriculture Development Officers (DADOs) targeting an Extension Planning Area (EPA) in Mzimba and Salima Districts
- Installation of the dryer for the on-station maize drying testing in the Department of Energy Studies at Mzuzu University.
- Acquisition of weather data for the two districts from the Director of Metrological and Climate Change Services.
- Application for ethical clearance from the National Committee on Research in the Social Sciences and Humanities (NCRSH).

Following consultations with District Agricultural Development Officers (DADOs) from the two districts, Bwengu EPA in Mzimba and Chinguluwe EPA in Salima were chosen as project sites. The project team also developed a consolidated budget and work plan for 2017/18 in preparation for the commencement of the project. In addition, the Project Team organized an inception workshop for the project on 8th May, 2017 at Mponela.



Figure 18: Group Photo – APPSA Solar Dryer for Maize Project Inception Workshop

Upcoming Projects and Partnerships

The following new projects are in the pipeline:

Southern Africa Power Pool (Sapp) - CTCN-Multi - Country - Request for Development of a Regional Efficient Appliance and Equipment Strategy in Southern Africa

NCST in collaboration with the Power Utility Company (ESCOM) developed a proposal for Malawi to participate in the SAPP- CTCN-multi - country project proposal for the Development of a Regional Efficient Appliance and Equipment Strategy in Southern Africa. The Southern African Power Pool (SAPP) Energy Efficiency Framework, which aims at prioritizing energy efficiency measures would like to implement a project in the SADC region that will advance energy efficiency in appliances and equipment. The target is to increase electricity savings from energy efficiency measures by 15% by 2030. In order to achieve this target the region is required to implement regulatory mechanisms, supporting policies and a management, verification and enforcement (MV&E) scheme.

The proposal emanates from the February 2015 SAPP - UNEP workshop held in Johannesburg to develop a regional roadmap for leapfrogging to efficient lighting, appliances and equipment in SADC. To help address the electricity crisis in the region, the workshop participants agreed to move towards regionally harmonized standards and suggested to prioritize lighting, refrigerators, air conditioners, water heaters and distribution transformers as high impact opportunities offering the most cost-effective and fastest way to save energy in the region. It was further agreed to seek Technical Assistance from the Climate Technology Centre and Network (CTCN) to perform country-specific prioritizations of products based on ease and speed of potential impact.

SADC countries agreed that implementing agencies for the project should be the Power Utility Companies and in Malawi the implementing agent for the project is ESCOM. By end of October 2017, all SADC member states had endorsed the project through their National Designated Entities. SADC has since acknowledged Malawi's endorsement.

Mercury Initial Assessment Project

Following invitation by the Environmental Affairs Department, NCST participated in an inception workshop on Mercury Initial Assessment (MIA) project at Lilongwe Hotel on 27 and 28 July, 2016. The EAD organized the meeting to brief national stakeholders on MIA project. With support from Global Environmental Facility (GEF), the EAD will coordinate the implementation of a project that is entitled "*Development of Minamata Convention on Mercury Initial Assessment in Africa.*" The project covers Angola, Zimbabwe and Malawi. The project that will take place in Malawi is christened Mercury Initial Assessment project but it is part of the 3 country Minamata project.

The objective is to facilitate the ratification and early implementation of the Minamata Convention on Mercury through the implementation of obligations under the Convention with the involvement of relevant national stakeholders. The objective of the Minamata convention on mercury is to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. Mercury affects human health in that it causes Minamata disease. Minamata disease is caused specifically by methylmercury poisoning. The symptoms of the disease include: sensory disturbances, ataxia, dysarthria, constriction of the visual field, auditory disturbances and tremor. Presentations were made on Minamata Convention on mercury, Minamata Initial Assessment project in Africa, Key steps for becoming a party to the Minamata convention on Mercury, the Mercury Initial Assessment (MIA) project work plan and components of the MIA. The National Inception workshop also discussed practical arrangements for implementation of the MIA project, deliverables and other issues that must be mastered, like the mercury assessment tool kit for carrying out the project. The objectives of the workshop were:

- a) To brief stakeholders on the Minamata Convention on Mercury and the Minamata Initial Assessment project in Africa;
- b) To present the Project Work Plan on Mercury Initial Assessment;
- c) To brief stakeholders on the toolkit for Mercury assessment.

It was reported that most African countries do not manufacture mercury and mercury compounds but rather import them for domestic use and otherwise. Due to lack of awareness about the adverse effects of mercury on health and the environment, its misuse has generated a number of challenges in these countries. There is need to address the challenge. It was also reported that Malawi has not yet ratified the convention as she awaits the initial assessment report before making a decision. There will be need for 50 countries to ratify the convention before the convention can be enforced. So far, there are only 28 countries worldwide that have ratified the convention, amongst these there are 12 African countries. Malawi signed the convention but she has not ratified it as it awaits the outcomes of MIA project.

An important first step, before Malawi ratifies the convention, is to understand the mercury situation in the country and the requirements for the convention. The project results will help Malawi to decide if it is worthy joining the convention or not. With the information gathered through the project, appropriate and effective measures can be put in place to ensure that the country complies with the provisions of the Convention if Malawi ratifies it. In this regard, the Malawi mercury initial assessment project will be undertaken starting from 2016 to 2017. The project will be spearheaded by the EAD.

Financial Statements

FINANCIAL STATEMENTS FOR THE YEAR ENDED 30TH JUNE 2017

	2017 (MK)	2016 (MK)
Income		
Subvention	247,500,000	283,505,528
Biosafety Programme (PBS)	116,272,281	99,483,860
NAC Traditional Medicine b/f	-	-
IST Africa	8,164,000	1,044,630
Review fees	101,938,165	32,051,773
CAAST Net plus	-	-
NCST- RLEEP	-	18,575,340
Share project	-	-
Revolving fund Interest	320,000	490,000
Interest receivable	495,171	1,815,563
Other income	13,273,116	1,803,894
Global Biodiversity Information	-	937,798
Solid waste management	-	4,361,078
Sub Total income	487,962,734	444,069,464
Other income		
Exchange gain	-	-
Total income	487,962,734	444,069,464
Expenditure		
Staff expenses	207,476,685	201,914,018
Operational expenses	126,786,215	99,320,491
Board Expenses	17,554,080	12,189,119
Bank and finance charges	2,410,656	371,156
Project Expenses	107,079,646	111,081,029
Total expenditure	461,307,283	424,875,813
Surplus/(deficit) for the year	26,655,450	19,193,651

STATEMENT OF FINANCIAL POSITION AS AT 30 JUNE 2017

ASSETS	2017 (MK)	2016 (MK)
Non-current assets		
Property, plant and equipment	<u>19,729,419</u>	<u>3,370,868</u>
Total non-current assets	<u>19,729,419</u>	<u>3,370,868</u>
Current assets		
Inventory	4,164,989	3,680,340
Trade and other receivables	9,539,234	8,018,599
Cash and cash equivalents	<u>113,011,994</u>	<u>86,435,379</u>
Total current assets	<u>126,716,218</u>	- 98,134,318
Total assets	146,445,637	- 101,505,186
FUNDS AND LIABILITIES		
Capital Funds	82,069,869	88,793,410
Accummulated Funds	<u>64,375,768</u>	<u>12,470,108</u>
Total funds	146,445,637	- 101,263,518
Current liabilities		
Trade and other payables	-	241,667
Total current liabilities	-	- 241,667
Total funds and liabilities	146,445,637	- 101,505,185

