8th NATIONAL SCIENCE, TECHNOLOGY, INNOVATION CONFERENCE AND EXHIBITION

STICE JUNE 14TH - 16TH 2023
Science, Technology and Innovation Conference & Exhibition

REPORT

Tanzanite Main Sponsor

The Eighth National Science, Technology, and Innovation Conference and Exhibition (8th STICE) event was held from June 14th to 16th, 2023, at the Julius Nyerere International Convention Centre in Dar es Salaam, Tanzania.

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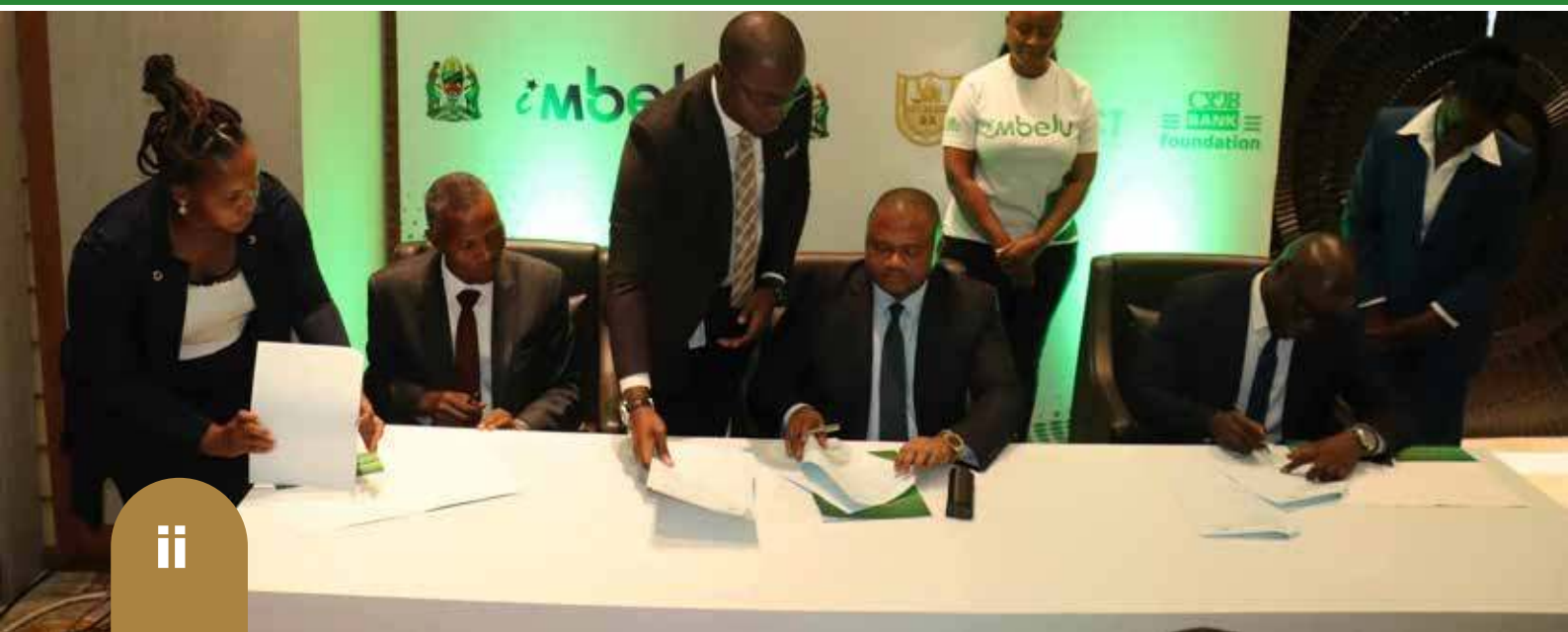

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY

NATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CONFERENCE AND EXHIBITIONS (STICE)

Eighth STICE Report

JULIUS NYERERE INTERNATIONAL CONFERENCE CENTER (JNICC) DAR ES SALAAM, TANZANIA

JUNE 2023

Editors:
Eng. Samson Mwela
Dr. Deogracious Protas
Ms. Bestina Daniel
Mr. Stivin Nchimbi
Mr. Gabriel Chowo
Ms. Erica Nkonoki

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The 8th National Science, Technology and Innovation Conference and Exhibitions was Organized by COSTECH in partnership with the Ministry of Education, Science and Technology through the World Bank financed Higher Education for Economic Transformation (HEET) Project.

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ACKNOWLEDGEMENT

Tanzania Commission for Science and Technology would like to thank all the participants for their engaging and their contributions at the 8th STICE event. Remarkably, more than 1,720 participants played a valuable role, ranging from keynote speakers, moderators, panelists, paper and poster presenters, exhibitors, rapporteurs and participants of symposia. We wish to acknowledge the support of the Government of the United Republic of Tanzania, Partners and Sponsors of the Conference, without whom this event would not have been possible. This conference report is available on https:// costech. or.tz/ and could be cited as The 8th National Science, Technology and Innovation Conference and Exhibitions, 2023 Conference report and deliberation: "Science, Technology and Innovation for Sustainable Development". Julius Nyerere International Conference Centre, Tanzania, 14th – 16th June, 2023.

ABBREVIATIONS

COSTECH	TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY
CRDB	COOPERATIVE AND RURAL DEVELOPMENT BANK
DTBi	DAR TEKNOHAMA BUSINESS INCUBATOR
EU	EUROPEAN UNION
IR	INDUSTRIAL REVOLUTION
MAKISATU	MASHINDANO YA KITAIFA YA SAYANSI, TEKNOLOJIA NA UBUNIFU
NRF	NATIONAL RESEARCH FOUNDATION
R&D	RESEARCH AND DEVELOPMENT
STI	SCIENCE, TECHNOLOGY AND INNOVATION
STICE	SCIENCE, TECHNOLOGY AND INNOVATION CONFERENCE AND EXHIBITIONS
ICT	INFORMATION AND COMMUNICATION TECHNOLOGY
TACRI	TANZANIA COFFEE RESEARCH INSTITUTE
TAFIRI	TANZANIA FISHERIES RESEARCH INSTITUTE
TAFORI	TANZANIA FORESTRY RESEARCH INSTITUTE
TALIRI	TANZANIA LIVESTOCK RESEARCH INSTITUTE
TAWIRI	TANZANIA WILDLIFE RESEARCH INSTITUTE
TIRDO	TANZANIA INDUSTRIAL RESEARCH AND DEVELOPMENT ORGANIZATION
TSA	TANZANIA STARTUP ASSOCIATION
TSN	TANZANIA STANDARD NEWSPAPERS LTD
TTCL	TANZANIA TELECOMMUNICATIONS CORPORATION
UNCDF	UNITED NATIONS CAPITAL DEVELOPMENT FUND
UNDP	UNITED NATIONS DEVELOPMENT PROGRAM
UNICEF	UNITED NATIONS CHILDREN'S FUND

EXECUTIVE SUMMARY

The 8th National Science, Technology and Technology Conference and Exhibition (8th STICE) event was held from 14-16 June 2023 at the Julius Nyerere International Convention Centre. It was organized by the Tanzania Commission for Science and Technology (COSTECH) in collaboration with the Ministry of Education, Science and Technology through the World Bank financed Higher Education for Economic Transformation (HEET) Project, CRDB bank as Tanzanite (Main) sponsor, UNCDF as Gold sponsor, UNDP-Funguo as Silver sponsor, Innoversity project and Ifakara Health Institute as Bronze sponsors.

The objectives of the conference was to disseminate research results on the use of STI in National development,The conference brought together policymakers, academicians, researchers, innovators, entrepreneurs, inventors from the public, private sectors, and development partners from various disciplines to share experiences and deliberate how STI contributes to national development vision and missions. The forum provided the platform for participants to present research results, exhibit/ showcase the innovated product and discuss recent trends, and challenges facing STI issues in the country. The linkages between industry, researchers and innovators on how they can deliberately work together towards STI developments were consolidated in this event.

The main theme of the conference was “Science, Technology and Innovation for Sustainable Development” with supporting six sub-themes that were well covered in the plenary and technical symposia sessions. Just to mention the title of the sub-themes were Nation’s Preparedness for the 4th industrial revolution; STI for green, resilient and inclusive economy; Innovation for human development; Contribution of Traditional Knowledge in STI development in Tanzania; Open Science and policy interface and the Role of Biotechnology towards the 4th industrial revolution.

The conference was officiated by Prof. Lugano Kusiluka, the Vice-Chancellor of University of Dodoma in Tanzania on behalf of Hon. Prof. Adolf Mkenda (MP) the Minister for Education, Science and Technology and the closing ceremony by Dr. Amos Nungu the Director General for Tanzania Commission for Science and Technology (COSTECH).

The 8th STICE event comprised of various sessions including the conference opening; keynote speeches; plenary presentations; parallel session presentations; interactive presentations and symposia. In addition to the conference scientific sessions, there were thirty-eight (38) exhibitors (national & international) who showcased their products and activities during the conference.
The conference was attended by more than 1,720 participants of which 1,120 were physically attendees, and about 600 were virtually attendees. The working language of the conference was Swahili and English.

RECOMMENDATIONS

Recommendations of the 8th National Science, Technology and Technology Conference and Exhibition (8th STICE): "Science, Technology and Innovation for Sustainable Development".

1. The government should strengthen the National Fund for Advancement of Science, Technology, and Innovation (NFAST) by establishing specific sources of fund in order to achieve the goal of 1% of the Gross Domestic Product (GDP) for research as stipulated in the Lagos Agreement.

2. Due to the rapid growth of Science, Technology, and Innovation (STI), the Government should consider the possibility of establishing a specialized Ministry for Science, Technology, and Innovation to cope with the fast-paced changes resulting from the fourth industrial revolution.

3. The government should establish a National Conservation of Traditional Knowledge and Local Varieties for future generations, and also establish innovation ecosystem village.

4. The government should continue to improve infrastructures including, higher education and research instituition network – HERIN, communication, energy, etc. that will support the rapid growth of Science, Technology, and Innovation (STI) in various parts of the country.

5. The private sector and industries should be provided with an incentive policy framework such as waiving of taxes, and to participate in and develop all aspects of STI in the country, including investing in Tanzanian innovations ecosystems. This framework should include, among other things, special incentives for private sectors that contribute significantly to the development of STI in the country.

6. The six sub-themes of the 8th STICE event should be a priority for the government in Science, Technology, and Innovation (STI) to achieve sustainable national development. These issues are: Nation's Preparedness for the 4th industrial revolution; STI for green, resilient and inclusive economy; Innovation for human development; Contribution of Traditional Knowledge in STI development in Tanzania; Open Science and policy interface and the Role of Biotechnology towards the 4th industrial revolution.

CONFERENCE PREPARATORY ACTIVITIES

In accordance with the concept note of the 8th National Science, Technology and Technology Conference and Exhibition (8th STICE) approved by the Tanzania Commission for Science and Technology (COSTECH) management on November 2023, preparatory activities of the 8th STICE were coordinated by the National STICE event committee.

The 8th STICE organizing committee was established, and the secretariat had total of 45 (24M/21F) members. The committee has members from COSTECH and external representatives from Presidents Office, Prime Minister's office, Dar es Salaam Regional Commission Office, Ministry of Education, Science and Technology, Ministry of Information, Communication and Information Technology, University of Dar es Salaam, Tanzania Broadcasting Corporation, Clouds Media Group, Zanzibar Broadcasting Corporation, and a member from Tanzania Startup Associations.

In line with the concept note of the 8th STICE event, ten (10) sub-committees were created. Members for each sub-committee were appointed according to their expertise. Each sub-committee had an appointed chair and a secretary. The sub-committees were:

1. Invitations, Reception, and Protocol sub-committee
2. Security and Safety sub-committee.
3. Decorations, Venue, and Entertainment sub-committee.
4. Publicity, Communication, and IT sub-committee.
5. Transportation and Accommodation sub-committee
6. Food and Drinks sub-committee
7. Budget and Procurement sub-committee
8. Documentation / Scientific sub-committee
9. Speech sub-committee
10. Exhibitions sub-committee

The branding and publicity of 8th STICE was conducted following the established publicity plan through various fora including preparation of 8th STICE knowledge products (infographics and flyers), press conference, editor's forum, awareness creation via various Television and Radio sessions, establishment of STICE website (http://stice.costech.or.tz/), and airing STICE adverts through social media platforms.

Scientific activities such as call for abstracts, abstracts review, call for full papers, full paper review, preparation of conference program, book of abstract, and a conference proceeding were handled by the 8th STICE Secretariat in collaboration with the scientific sub-committee. The secretariat reached out to the Chief Editor of the East African Journal of Science, Technology, and Innovation (EAJSTI) to explore a collaborative opportunity for publishing the full papers presented at the STICE event. Ultimately, 32 of these papers were published as a special issue in the EAJSTI, available at https://www.eajsti.org/index.php/EAJSTI/issue/view/20.

The 8th STICE Secretariat also developed instructions and guidelines that were used for the conference to guide the keynote speakers, moderators, discussants, paper presenters and rapporteurs of plenary sessions and technical symposia. Also, the secretariat prepared a conference program that was used to guide sessions, side events, and other conference activities as indicated in Appendix I.

Contents

1. INTRODUCTION

Tanzania Commission for Science and Technology (COSTECH), established by the Act of Parliament No. 7 of 1986 as a parastatal organization under the Ministry of Education, Science and Technology is the principal advisory organ to the Government on all matters pertaining to Science, Technology and Innovation (STI) and their application for socio-economic development of the country. The advisory role include: advise in the formulation of policies relating to STI; coordination, monitoring and evaluation of scientific research and technological development; acquisition, storage and dissemination of scientific and technological information; examination and promotion of R&D Programmes; mobilization and disbursement of funds for R&D; fostering regional and international cooperation; facilitation of the commercialization of research results; initiation, formulation and implementation of research priorities and Programmes. To do this, COSTECH collaborates with and acts as a national focal point for cooperation with regional and international scientific institutions and agencies.

The organizational structure of COSTECH is a three tier, consisting of the Commission, R&D Advisory Committees and the Secretariat. Composition of the Commission and R&D Advisory Committees that embraces both, public and private Universities, Government departments and major national R&D institutions affiliated to COSTECH makes COSTECH a unique body for local R&D, regional and international linkages necessary for the development of STI in the country. The strength of COSTECH lies on its legal establishment and autonomy status.

In promoting science, technology and innovation in the country, COSTECH has since been organizing the Annual National Science, Technology and Innovation Conference and Exhibition (STICE) events. This year, the 8th STICE event was organized and conducted from June 14th to 16th, 2023, at Julius Nyerere International Convention Center (JNICC), Dar es Salaam. The 8th STICE event brought together researchers, academicians, innovators, entrepreneurs, inventors from the public, private sectors, development partners and policy/decision makers from various disciplines to share experiences and deliberate how STI contributes to attaining Sustainable Development Goals (SDGs), East African Vision 2050, Tanzania Development Vision 2025 and the five years' development plan 2021/22 – 2025/26, which emphasize on building a competitive economy and industries for human development.

5.1 The objectives of the 8th STICE

The 8th STICE event offers a platform for:

1. Scientific dialogue and exhibition of technologies and innovation products and services;
2. National leaders to meet with scientists, researchers, policy makers, innovators, funders, development partners and industry players;
3. Exchanging information and experiences among scientists, technologists and innovators working in various fields;
4. Private- public policy dialogues on the utilization and application of science, technology and innovation;
5. Updating the public on the status, trends and opportunities of STI;
6. .Providing evidence to the policy and decision makers on STI findings in various sectors

5.2 The conference theme and sub-themes

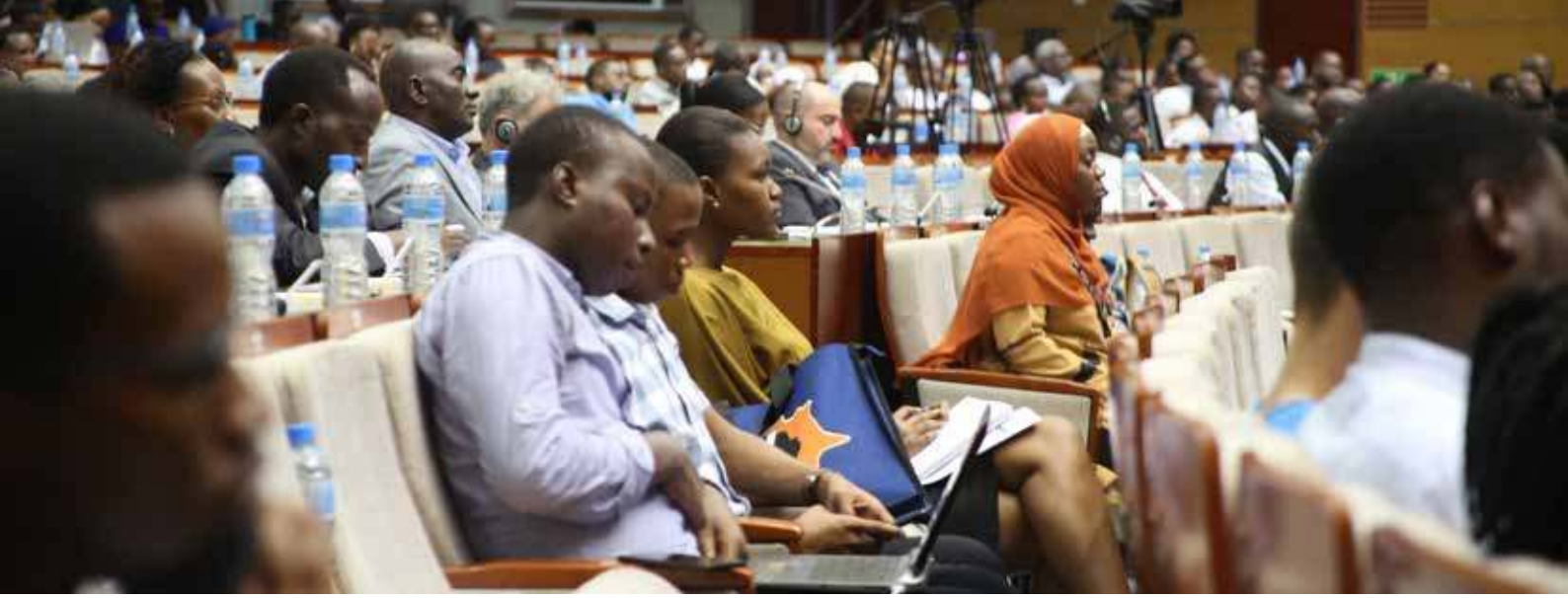
The conference main theme was ***'Science, Technology and Innovation for Sustainable Development'*** and had five of sub themes as shown below:

a. Nation's Preparedness for the 4th industrial revolution
b. STI for green, resilient and inclusive economy
c. Innovation for human development
d. Contribution of Traditional Knowledge in STI development in Tanzania
e. Open Science and policy interface
f. Minor sub-theme: Role of Biotechnology towards the 4th industrial revolution

5.3 The conference side events

Despite of the above mentioned sub-themes, there were other eight (8) subjects of interests that were presented as side events during the 8th STICE event. These includes:

i. Seminar on the contribution of STI for socio-economic development
ii. Forum on Agriculture and Food Security
iii. Innoversity Startup Project event by Sahara Ventures
iv. Application of Modern Biotechnology in Health in Tanzania
v. The Nexus of Climate Change, Defence and Security
vi. Government of Tanzania and Development Partners working group session
vii. Research and Development Advisory Committee Meeting on Linkages between Higher Learning, Research and Development institutions and Industry.
viii. Research and Development Advisory Committee Meeting on Community Engagement in research



5.4 Conference Participants

5.4.1 Registered Conference Participants

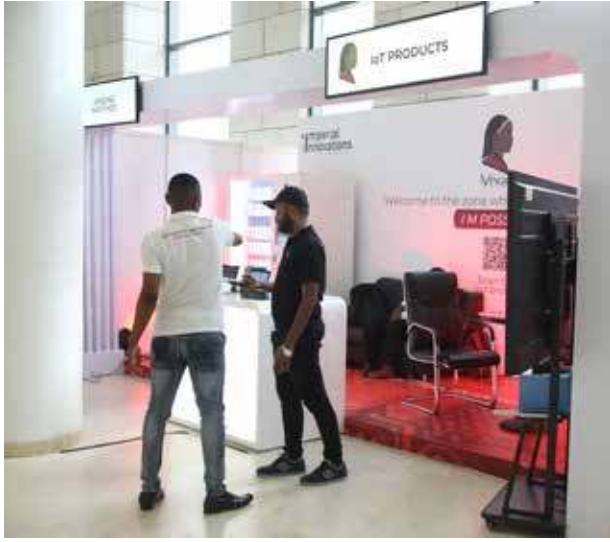
About 1,120 participants were recorded in the three days of the 8th STICE event (day1-415, day2-330, day3-375 participants), excluding the invited guests who attended the side events. Among these participants; six were keynote speakers who presented and led the keynote sessions, and 19 moderators, 38 rapporteurs and 25 discussants for both plenary session and technical symposia, respectively. A total of fifty-six (56) papers and sixteen (16) posters were presented.

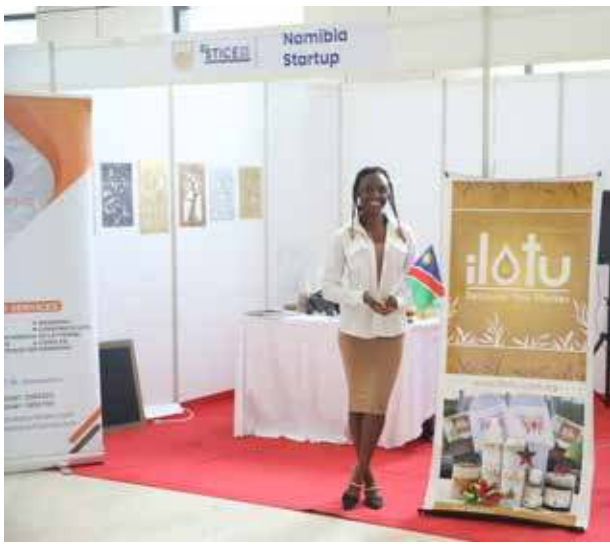
In the side event rooms, 267 participants were recorded in the attendance registry form as follows;

- Seventy (70) participants attended Seminar on the contribution of STI for socio-economic development and a Forum on Agriculture and Food Security,
- Sixty-eight (68) participants attended Innoversity Project event seminar,
- Twenty-seven (32) participants attended Application of Modern Biotechnology in Health in Tanzania,
- Twenty-six (26) participants attended The Nexus of climate change, Defence and Security,
- Thirty-six (36) participants attended Government of Tanzania and Development Partners working group session, and
- Thirty (35) participants attended R&D Advisory Committees Meeting on Linkages between HL, RD institutions and Industry and community engagement.

5.4.2 Participating Institutions and Development partners

From the registration records we find that eighty-three (83) institutions participated during the 8th STICE event which took place in Dar es Salaam at Julius Nyerere International Convention Centre (Refer Appendix I).





2. REMARKS FROM THE GUEST OF HONOR

Professor Lughano Kusiluka, the Vice Chancellor for University of Dodoma officiated the 8th STICE event on behalf of Professor Adolf Mkenda (MP) who is the Minister for Education, Science and Technology. Different from previous meeting, the guest of honor appeared in the closing ceremony as innovative approach to ensure all discussed matters during the conferences are captured and presented as result of the event. In the closing speech, he congratulated the organizing committee for the conference theme, “Science, Technology and Innovation for Sustainable Development”. He pointed on the conference theme and five sub-themes (namely Preparedness for 4th Industrial Revolution; Biotechnology; Traditional knowledge; Green, resilient and inclusive economy; and Open science policy and interface) are in line with National Development Vision 2025, Five-Year National Development Plan 2021/22-2025/26 and 2020 CCM manifesto, that aims at improving economy through industrial development.

In the speech, he noted that, industrial economy need more scientific human resources to solve everlasting challenges identified in National Research Priorities 2021/22- 2025/26 such as agriculture, ICT, Health, industrial etc. He further emphasized that strengthening collaboration among Science, Technology and Innovation stakeholders is of paramount important in solving overarching challenges hindering socio-economic well-being such as generating employment, access to health services and income generation. On the other side, he called upon all stakeholders (public and private sector, and Higher Learning and Research Institutions) to invest more in STI. He commended that the effort of empowering young generations aligns with changing pace in the global STI needs.

He concluded his remark by insisting that, COSTECH needs to thrive towards successfully STI despite the noted effort made so far while referencing the fast growing technological change in fourth industrial revolution (4IR). He also committed that the government will work on all key recommendations concluded in the conference for betterment and sustainable socio-economic development of the nation. In providing the recommendation based on conference set-up, he proposed on the need for unifying the effort for organizing STI conferences instead of current set-up where Higher Learning and Research Institutions independently organizing STI conference.

3. PLENARY SESSIONS AND TECHNICAL SYMPOSIA

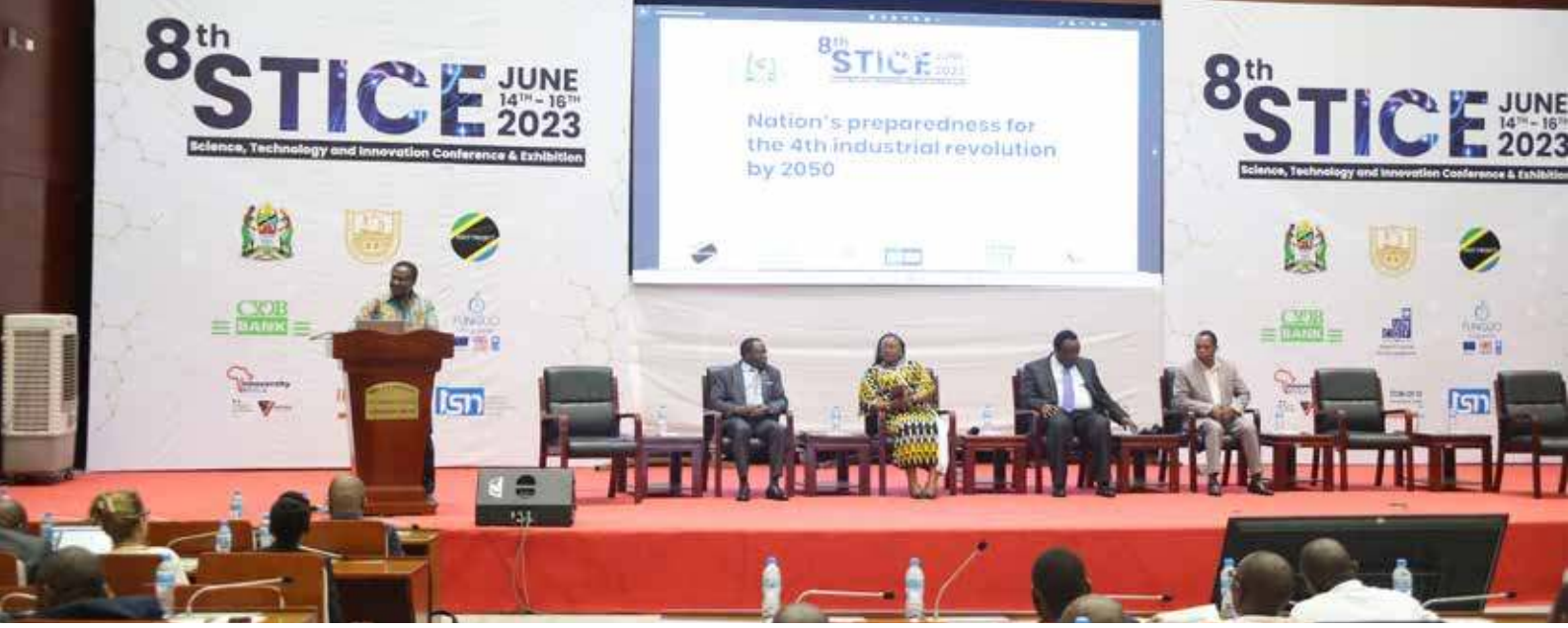
The 8th STICE event had six (6) keynote presentations which were presented in each subject aligning with the conference sub-themes. Despite of the plenary session, there were parallel Technical Symposia (Presentation of Research Papers) for the whole conference days and the venue for presentations and discussion were Selou, Ruaha, Mt. Meru, Udzungwa, and Saadan halls at JNICC. All presented papers were underlying with the conference sub-themes.

Fifty-six (56) scientific papers were presented, with thirty-two (32) of them subsequently published as a special issue in the East African Journal of Science, Technology, and Innovation (EAJSTI). You can access these papers at https://www.eajsti.org/index.php/EAJSTI/issue/view/20. The deliberations from keynote presentations and technical symposia for each sub-theme are summarized below:

3.1 Sub-theme I: Nation's preparedness for the 4th industrial revolution by 2050

Overview of the keynote presentation:

The presenters talked about the 4th Industry Revolution (4IR) based on the Human Resources capacity perspective; the 4IR based on the ICT infrastructure perspective in evaluating the performance of the digital financial services in Tanzania; the 4IR based on the Health sector perspective, and the 4IR based on the preparedness of Tanzania industries' perspective.



The discussion was engaging, and the discussants articulated and translated their knowledge and experience on the Nation's preparedness for the 4IR. The panel highlighted that physical, digital and biological worlds characterize the 4IR. The first presentation on infrastructure readiness described the history of industrial revolutions and benchmarked the 4th industrial revolution as the continuation of the 3rd industrial revolution focusing on the use of digital emerging technologies such as Internet of things (IoT), machine learning, argumented reality, artificial intelligence, cloud computing, big data analytics etc. in the provision of service and in production, the emphasise is to integrate the emerging technologies with physical and biological domain.

The technologies are distruptive in nature as they affect how we live, how we relate and how we do things and the second presentation from UNCDF analyzed how Tanzania is performing on digital financial services towards 4IR. It was also indicated that, Africa has contributed little to the previous industrial revolution. The 4th industrial revolution has come and Tanzania is not an island we need to prepare for full participation to enhance production and services thereafter our national economy.

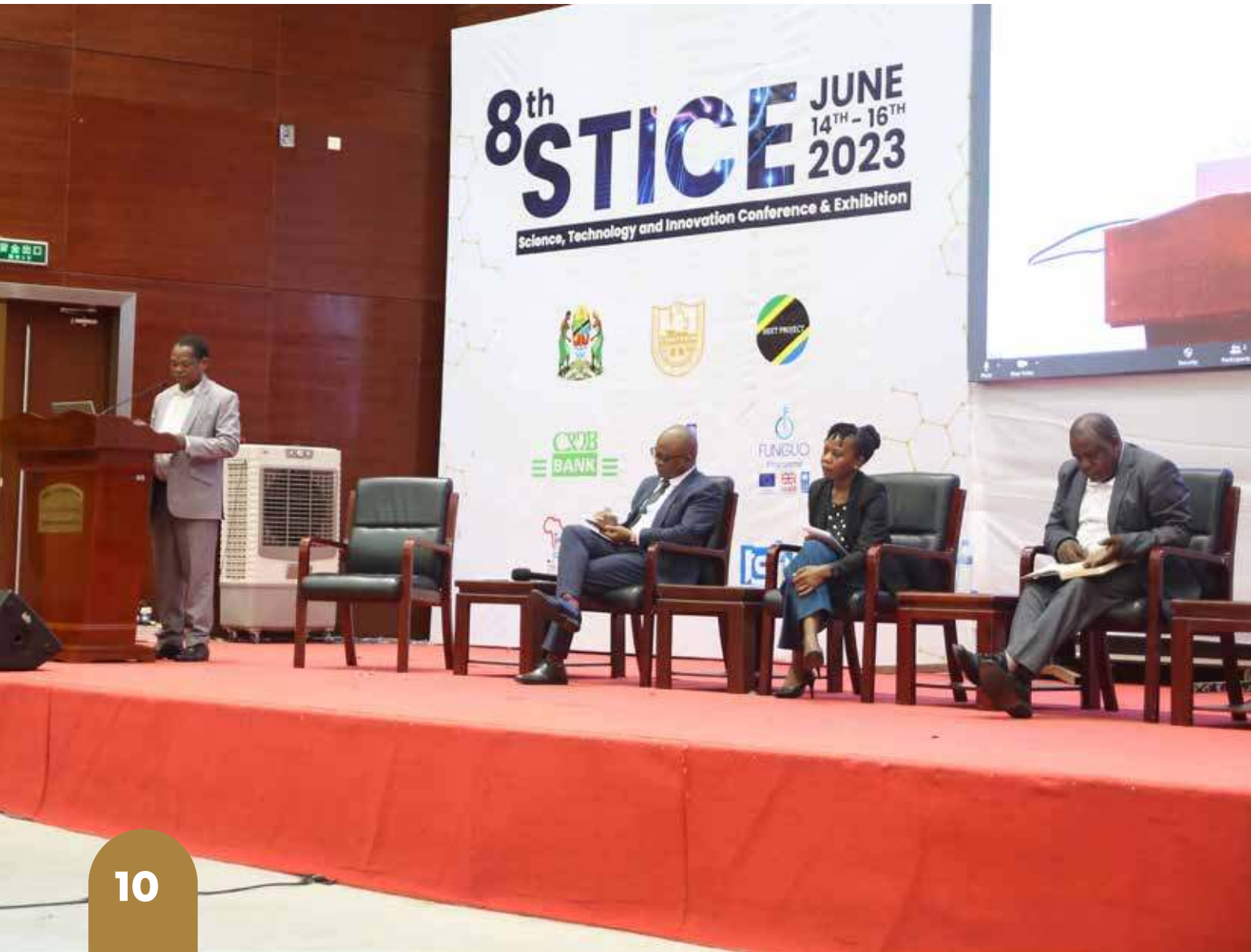
Tanzania is prepared for the fourth industrial revolution in terms of human resources through;

i. The ruling Party (Chama Cha Mapinduzi) Manifesto in its chapter 4 (103), recognizes that the digital economy (Uchumi wa Kidijitali) is vital in bringing development by increasing efficiency in production and the implementation of various activities and providing opportunities to increase the income of citizens.

ii. The Government has constructed the National ICT Broadband Backbone (NICTBB) to achieve its digital economy vision. Most of the Universities are teaching ICT subjects (including cyber security and blockchain), and recently the president has announced the intention of the government to establish an ICT (TEHAMA) university. Additionally, through Higher Education for Economic Transformation (HEET) Project, the government focuses to transform universities' education systems.

iii. Most emerging technologies are beneficial to humans rather than being harmful. The only challenge is; most technologies want humans to change their life styles by engaging in learning new techniques of living rather than practicing business as usual style. With the introduction of 4IR, Tanzanians should be taught and encouraged to change their life style rather than thinking on the harmful side of the technology.

iv. So far, Tanzania has done well; it is among the nations which are doing well towards the 4IR. However, we need to develop regulations and plans to foster the realization of an inclusive fourth industrial revolution.



Key issues emanated from the Session that Should be taken into the consideration to enable Nation's preparedness for the 4th industrial revolution by 2050

i. The government should develop a national framework and guidelines to guide research and innovation data management in the country.

ii. There are positive and negative impacts of the 4th industrial revolution, the Government have to capitalize on the positive impacts and prepare for adaptation strategies for the negative impacts

iii. Researchers should research within the national priorities with more focus on technology and innovation research.

iv. The country should develop and transfer its technology and avoid dependency on imported technologies.

v. There is a need for the government to formulate a taskforce that will develop a national framework to guide the usage of Blockchain and Bitcoin technologies.

vi. Government should develop the national database to store and manage all Tanzanian genomic (vinasaba) information collected from research.

vii. Recognized that the 4th industrial revolution has significantly improved the financial services in Tanzania, it has improved financial inclusion, financial health, and financial freedom

viii. There is a need to look at different policies on the taxes of different devices that facilitate digital transactions such as the cost of internet bandwidth should be feasible, and the cost of devices such as cellphones and other gadgets.

Technical Symposia: Summary of Presentations, Discussions and Recommendations

A total of 5 papers were presented include:

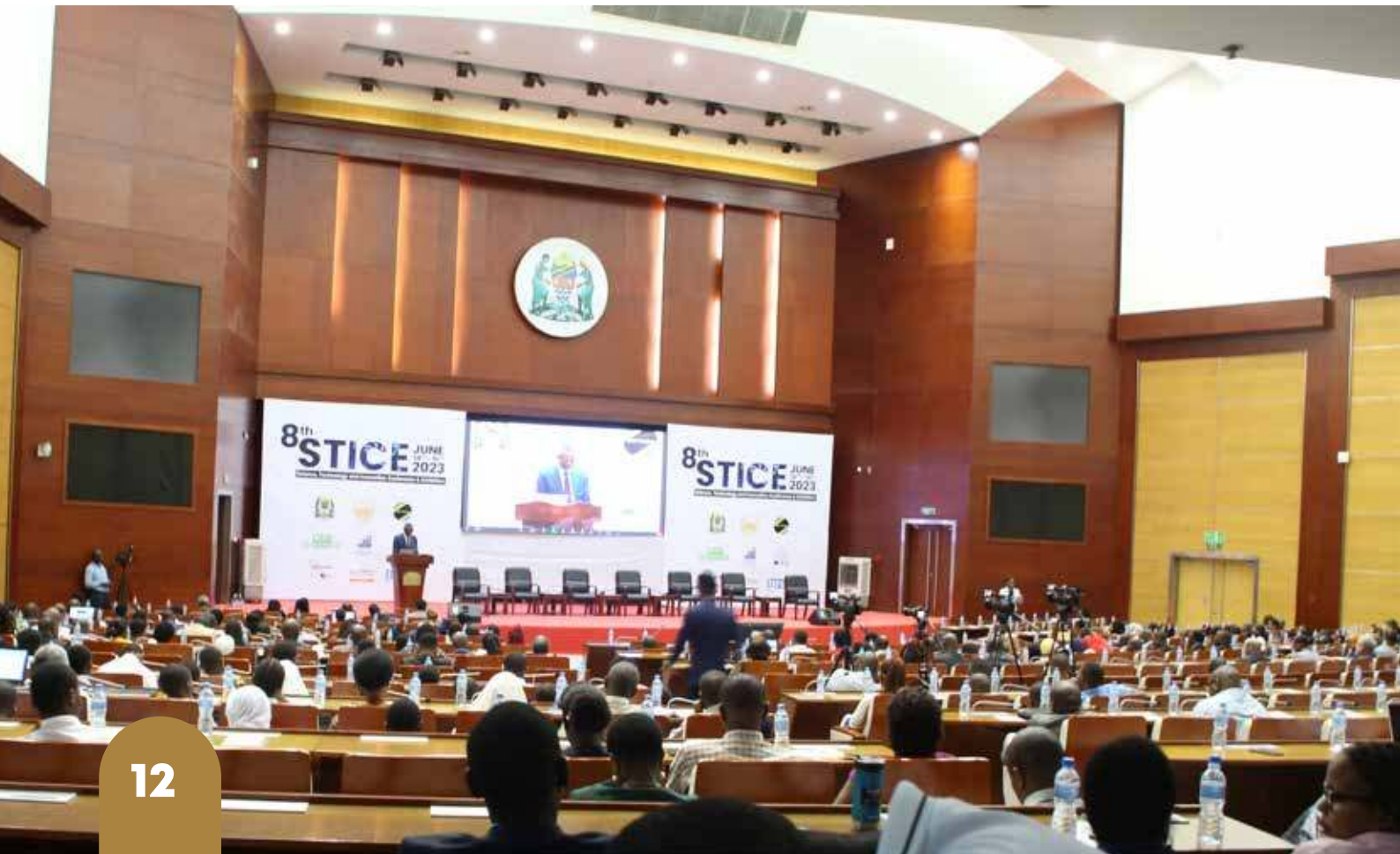
i. Developing Creativity and other Critical Skills for the Fourth Industrial Revolution among Secondary School Students in the Constructionist Learning Environment - Dr. Zebedayo Kyomo

ii. Development of Blockchain Labs to Promote Blockchain Research and Innovation in Tanzania - Dr. Anthony Kigombola

iii. Exploring current and future trends of predictive maintenance 4.0 in Tanzania: A systematic literature review (https://doi.org/10.37425/eajsti.v4i3.680) - Mr. Peter Fred

iv. The Fourth Industrial Revolution and Persons with Disabilities: The Case of Digital Inclusion at the Open University of Tanzania - Dr. Cosmas Myanyi

v. Determinants and Competitiveness of Rice Export in Tanzania: A Vector Error Correction Mode (https://doi.org/10.37425/eajsti.v4i3.774) - Ms. Win Luhwago



During the presentations the following issues were highlighted:

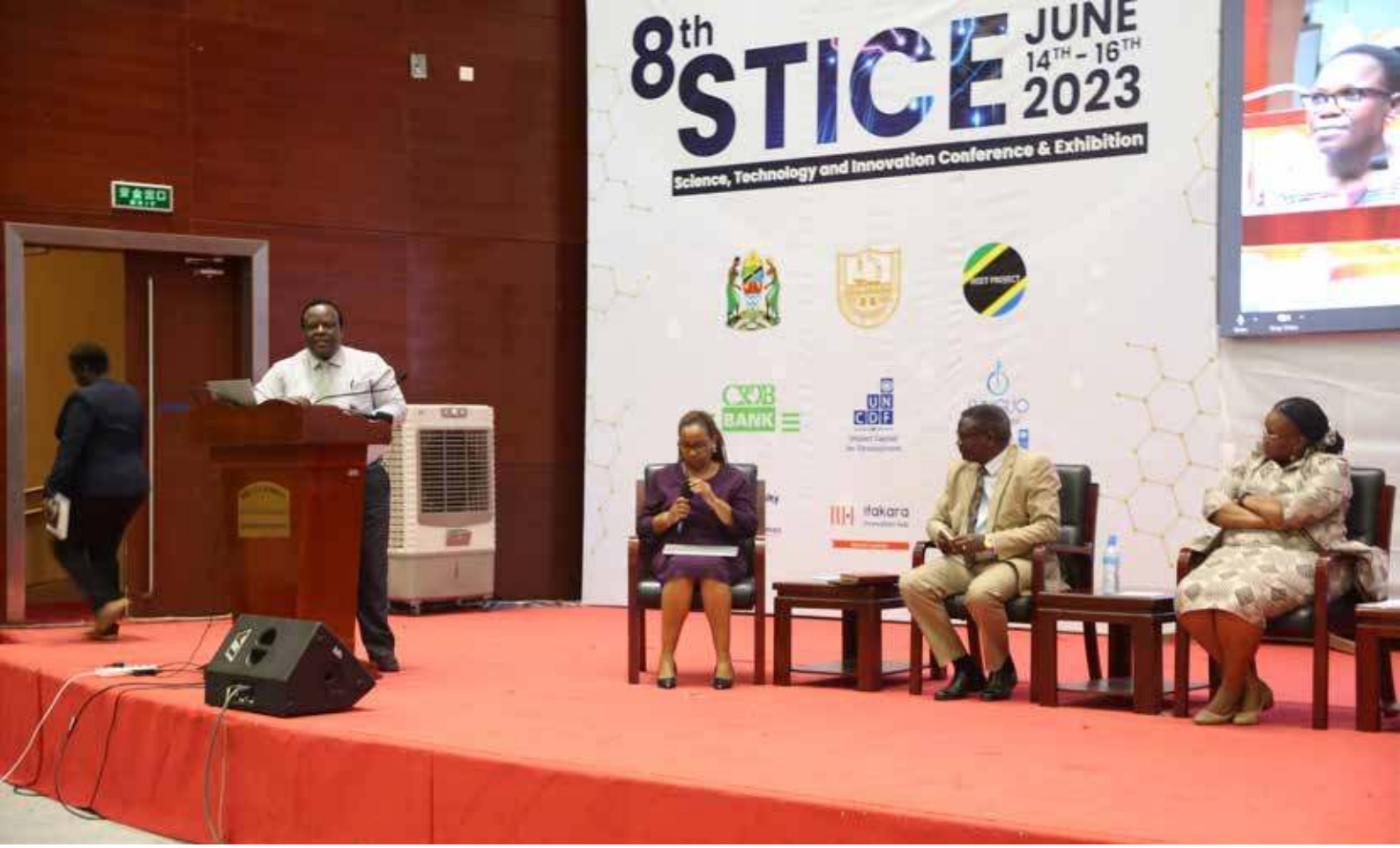
The first presentation intended to highlight the importance of innovation and creativity and how they can both contribute towards the current trend of 4th Industrial revolution. The presenter argued that Tanzania education system and curriculum should introduce creativity in learning and teaching as part of preparing the citizens to 4IR life style.

The second presentation outlined on how the Blockchain technology can be utilised in many industries to securely store and process data for ownership and use. The presenter revealed that currently is establishing a Blockchain Lab that can be able to store and process data in payments, health, value chain management and government.

The third presentation highlighted on how the emerging of advanced technologies (such as Industry 4.0, Digital Factory, Smart manufacturing) in the internet of things (IoT) has caused improvement of manufacturing strategies, business and organisational excellence. The presenter pointed out how the industry 4.0 can contribute towards the sustainable development goals (SDGs) with greater focus on poverty reduction, agriculture, industries and infrastructure development. Therefore, called for a need for the government to continue to create awareness to Tanzanians on the introduction of the 4th Industrial Revolution and its importance.

The Fourth presentation pointed out potential use of 4IR such as mobile phones to improve agricultural productivity. The presenter revealed that the use of Mastercard Farmers Network (MFN) as a digital platform that brings together various actors of agricultural value chains into digital trade play a great role to enhance agricultural marketing opportunities. Therefore, the session recommended that most of the technologies (mobile applications) developed to serve the rural community should consider utilising both feature and smart phones.

The last presentation focused on how the improvement of agriculture digitalization can contribute to improve the quality and quantity of rice that can be used to feed the industrial workers, the general public and for export. The presenter argues that if the application of big data, remote sensors, internet of things, blockchain and robotics is handled very well in agriculture sector, Tanzania will be in the position to feed itself and the world at large. Therefore, the government should invest heavily in rice subsector so that rice production can meet the 4th Industry Revolution needs, including quality and quantity for local consumption and export.



3.2 Sub-theme II: STI for Green, Resilient and Inclusive Economy

Overview of the keynote presentation:

The presenter defined what green, resilient and inclusive economy means, including;

a. Pursuing goals of poverty eradication and shared prosperity with a sustainability lens

b. Addresses the risks to people, the planet, and the economy in an integrated manner that is tailored to country needs and objectives

c. It includes the involvement of all gender in the economy

d. Sets a path that achieves lasting economic progress that is shared across the population, providing a robust recovery, and restoring momentum on the Sustainable Development Goals (SDGs 4, 6 & 9).

Presenter further narrated that green economy comprised of six sectors namely;
a. Green agriculture, b. Forest, c. Industry, d. Energy, e. Tourism, and f. Fisheries

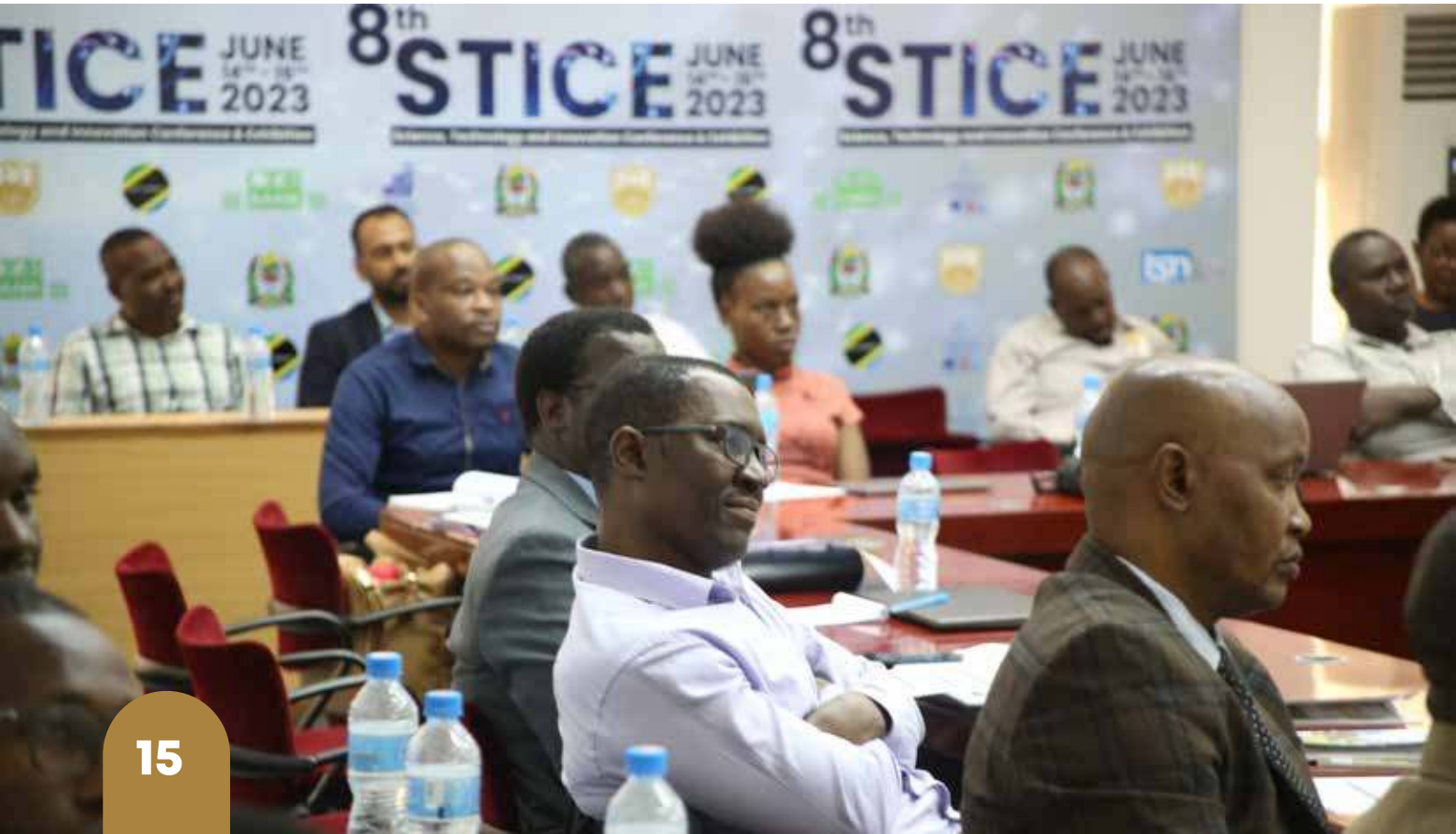
The presentation touched the preservation of ecosystem so as to ensure the sustainability of the green economy. It emphasized the proper utilization of STI in preserving ecosystem will ensure; ***a. Availability of nutrients, b. Preservation of water and air sources, c. Climate regulation, d. Presence of adequate creation areas, and e. Growth of recreation areas.***

Factors for consideration in achieving the green, resilient and inclusive economy were mentioned as following:

i. To have an approach that promotes economic growth and goes hand in hand with environmental goals and inclusion

ii. To make significant reforms, mobilize domestic resources fairly, deploy private sector solutions and put in place the investments needed for the transition

iii. Results of these transformations are likely to be unevenly distributed, so a range of social and labor market policies are also needed to compensate losers, safeguard the vulnerable, and deliver a just transition to a green economy.



Key issues emanated from the session that should be taken into the consideration to enable green, resilient and inclusive economy in Tanzania

Key issues emanated from the session that should be taken into the consideration to enable green, resilient and inclusive economy in Tanzania included;

i. The need to conserve environment in order to produce different ecosystem services.

ii. Build Institutional capacity e.g. human resources, infrastructure and skills

iii. Provide conducive environment in terms of policy, law and regulation.

iv. Increase/provide awareness campaign and understanding to all stakeholders.

v. Need to have sustainable investments in productive natural resources base

vi. Promote transfer and diffusion of the best available technology

vii. Support technological infrastructure to make it economical for transnational corporation (TNCs) to set up local innovation hubs and facilitative ecosystems

viii. Market potential and accessibility.

ix. Provide access and use of right technology

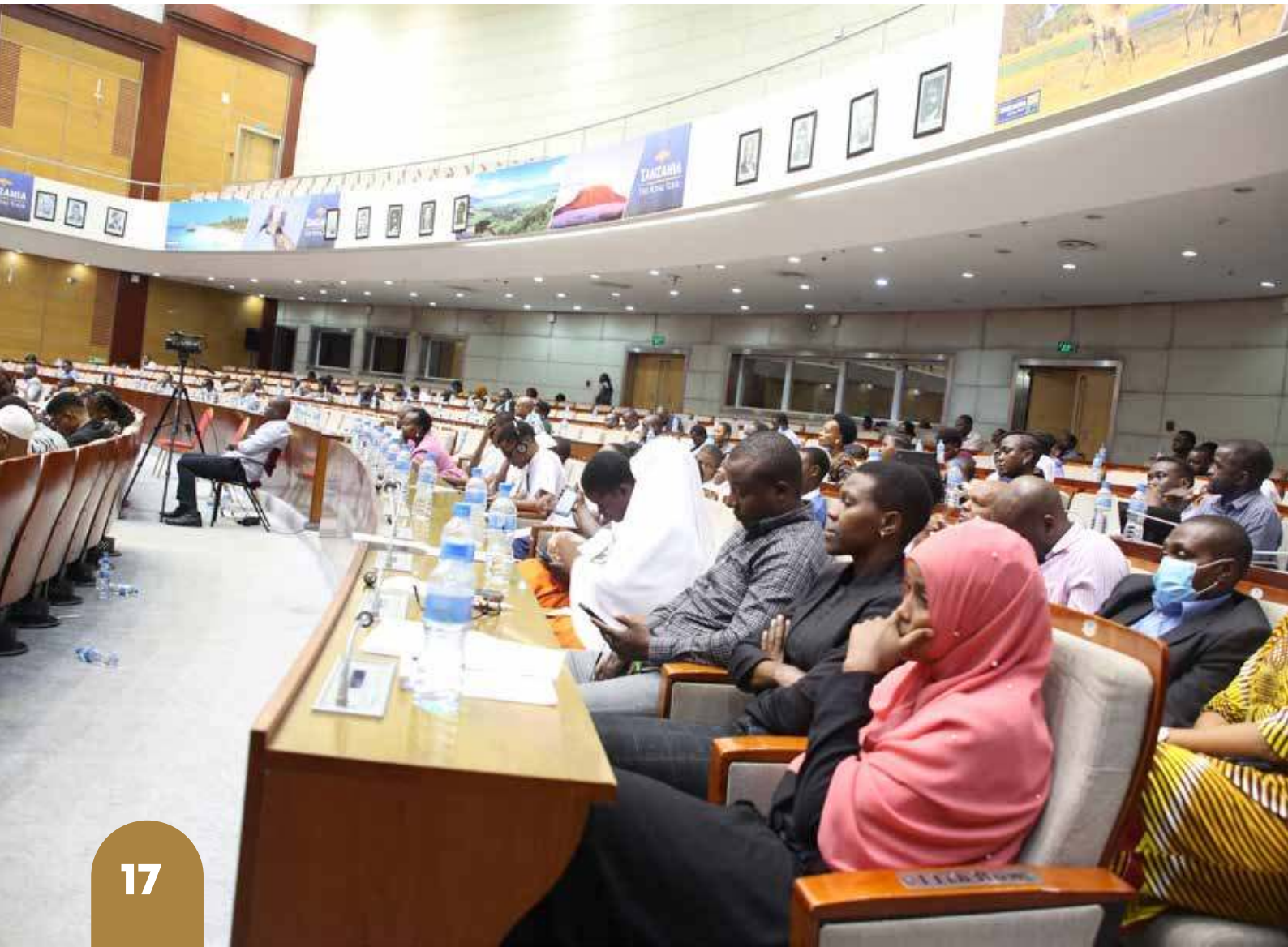
x. Build the right skills.

xi. Make sure no one is left behind, gender inclusivity, encourage multi-sectoral.

xii. Encourage partnership and collaboration Promote transfer and diffusion of the best available technology

xiii. Promote private sector development to play part in economy growth

It was concluded by the Moderator that, the role of STI in promoting Green, Resilient and Inclusive Economy is of paramount important. In this regard, appropriate policies should be put in place to promote STI integration in Green, Resilient and Inclusive Economy. Lastly, citizens should be educated and get awareness on the importance of green, resilient and inclusive economy.



Technical Symposia: Summary of Presentations, Discussions and Recommendations

The following papers were presented

i. Introducing Anti-mercury reagent and Movable sluicing as alternative of Mercury in gold recovery to small scale mining - Mr. Elick Stephano

ii. Suppression of Root - Knot Nematodes in Tomato (Solanum lycopersicum) and cucumber (Cucumis sativus) fields by using trichoderma and botanical pesticides - Dr. Yasinta Nzogela

iii. Assessment of the change in the collagen content of the skin due to unhairing process (https://doi.org/10.37425/eajsti.v4i3.692) - Mr. Azaria Chongeri

iv. The economic viability analysis on the Adopted Climate Change Adaptation Strategies among Maize small-holder Farmers in Kongwa District, Tanzania (https://doi.org/10.37425/eajsti.v4i3.697) - Dr. Mohamed Said

v. Screening of Aflatoxin Producing Fungi Associated with Maize in Selected Areas of Morogoro Municipality - Mr. Jumaa Athumani

vi. Limitations of Agroecological Practices and Stakeholders Response: A Case of Uluguru Mountains Landscape in Morogoro Municipality, Tanzania (https://doi.org/10.37425/eajsti.v4i3.676) - Dr. George T. Mhamba

vii. Effect of Tillage, Pre-Emergence and Post-Emergence Weed Control Options on Weeds, Cassava Growth and Yield at Kiimbwanindi Village in Mkuranga, Tanzania (https://doi.org/10.37425/eajsti.v4i3.690) - Mr. Joseph A. Leonard

viii. Biofungicidal effects of Commiphora swynnertonii (Burrt.) and Synadenium glaucescens (Pax.) against Tomato Fusarium Wilt Disease - Dr. Richard Madege

ix. Occurrence of entomopathogenic fungi of Spodoptera frugiperda (lepidoptera: noctuidae) in selected areas of Tanzania (https://doi.org/10.37425/eajsti.v4i3.691) - Mr. Emmanuel Nkuwi

x. Economics of Rice Irrigation Technologies in Kilombero Sub-Basin: A Case of Farming Households from Kilombero in Morogoro, Tanzania (https://doi.org/10.37425/eajsti.v4i3.672) - Mr. Martin Komba

During the presentations the following issues were highlighted:

In the process of gold extraction, the first presenter proposed the use of Anti-mercury reagent and Movable sluicing as efficient and economic approach for gold recovery compared to the commonly mercury usage in extraction of gold among small miners. Presenter pointed the mercury method is harmful to environment and human being. The presenter concluded that the purity of gold obtained during alternative method is 99% while those obtained through mercury extraction is 30-40%. Consequently, the method found to be environmentally and healthier friendly, so awareness is very important to small scale miners.

Another presentation aimed on the use of biological controls to suppress the soil-borne pathogen (nematodes) in tomatoes and cucumber. The nematodes make the plants not to absorb nutrients from the soil and eventually make the leaves of the plants to be yellowish in colour, affecting the plant photosynthetic rate leading to plant death. The team applies trichoderma and neemcakes in the soil to treat and suppress nematode infestations in the plants. Trichoderma and neemcakes are found to be most effective in treating the nematodes. Presenter finally proposed awareness creation among farmers on the use trichoderma and neemcakes as soil amendments for nematodes management.

The third presentation on assessing the impact of the change in the collagen content of the skin (leather) due to unhairing process, different parameters related to the collagen content and the leather strength were analyzed. The shrinkage temperature values were lower as compared to that of raw skin sample, where oxidative unhaired skin, shows high difference (50.50 C) from raw skin sample which was 64.90 C. There was no significant difference in the hydroxyproline concentration between unhairing, this was due to triple helix structure of the collagen which make it more stable and not easily breakdown due to unhairing chemicals. The collagen content test didn't show a significant difference among the alternatives; however, FT-IR results shows the differences in intensity (percentage) for side chain of collagen, where raw sample was 99.67%, oxidative was 90.83% while for conventional, hair saves and painting were 97.38%, 97.93% and 96.02% respectively.

The stretching of N − H bond and bending for C − N bond for amide II, displays vibrations with wavenumber of 1519.20cm- 1 for oxidative unhaired wet blue, as compared to other unhaired wet blue and raw skin sample which reads at 1539.20cm-1. There were small differences in strength of the leather produced. The differences were associated with the side chain intensity change and the collagen conformation. The strength properties of the leather do not depend only on the concentration of the collagen but also on the proper packing of the collagen structures. The disturbance occurs to the hierarchical network of the collagen was reflected in the physical properties of the leather. It was recommended to consider the environmental effect to the study.

In another slot, the economic viability analysis on the Adopted Climate Change Adaptation Strategies among Maize Farmers in semi-arid of central Tanzania was presented. The focus on the strategies adopted by smallholder farmers and nine (9) key informants involved in the primary data for maize in Kongwa, Dodoma. The study concludes that farmers should be advised to adopt the adaptation strategies which is economic viable with low risk, however, the strategies should be practical based on socioeconomic level of the farmers and environmental conditions. Some key issues such as the tendency of farmers to adopt more than one strategy at different stages of farming, the need to provide real time information to farmers, such as changing in rain season, emerged among the issues for further study. Also, it was advised that stakeholders such as government, researchers and other development partners need to assist farmers to select relevant and economic viable Climate Change Adaptation Strategies to improve crop production.

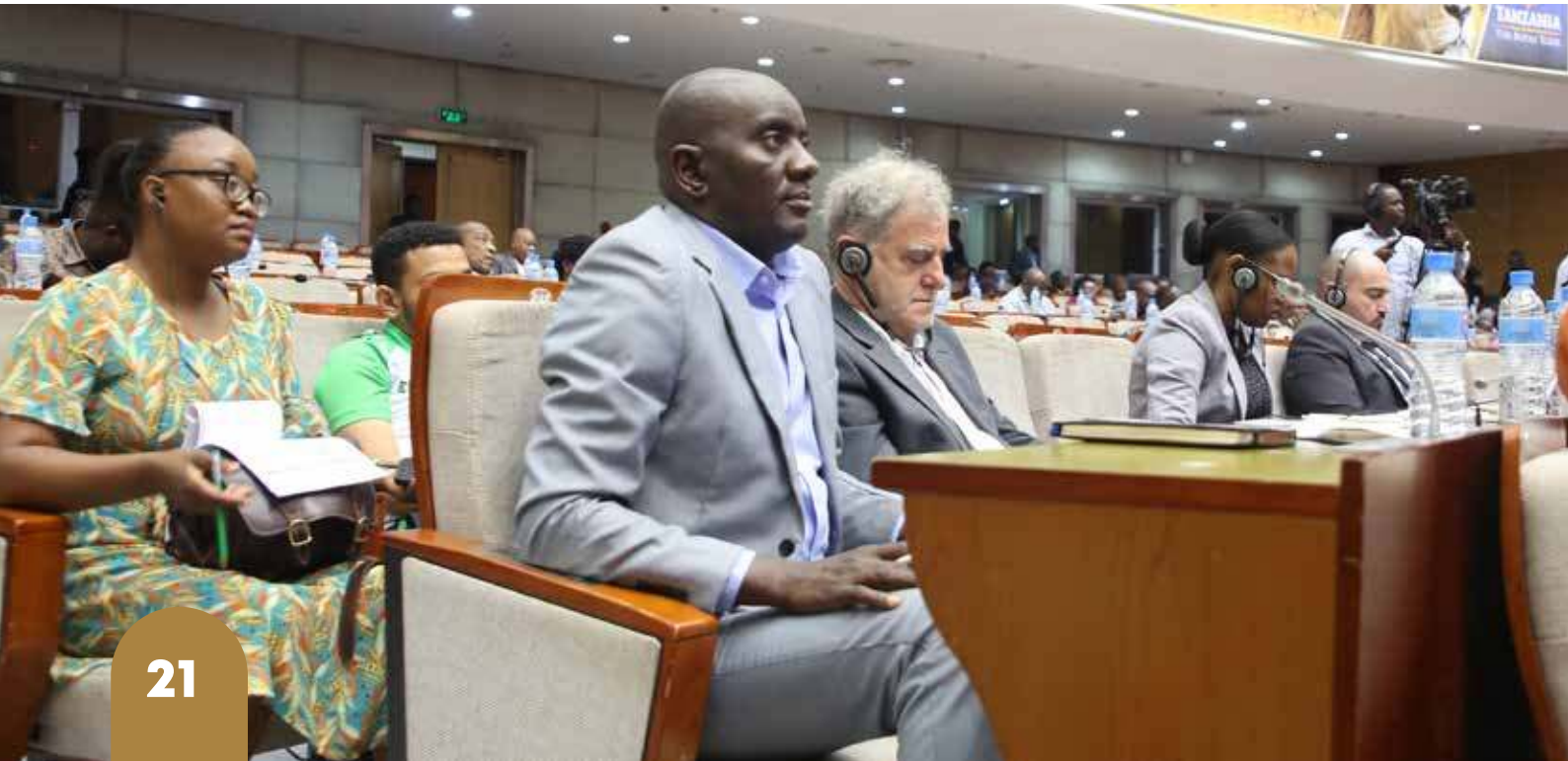
In the presentation on screening of aflatoxin producing fungi associated with maize in selected areas of Morogoro Municipality. A total 30 maize grains samples were analysed using several methods including blotter technique. Samples were then subjected to blotter and then grown mycelia were transferred to Potato Dextrose Agar (PDA). The results confirm that the presence of potential aflatoxin producing fungi that may colonize the maize both phenotypic and genotypic methods play a vital role and important tools in successful screening of aflatoxin producing fungi in maize, thus pave a way to put in place strong mitigation measures to combat fungal colonization and aflatoxin contamination in maize. The key issues arose include high temperature and moist environment are favorable environment for Aflatoxin by fungi. Human population are exposed to Aflatoxin via maize consumption hence control of post harvesting contaminations must be undertaken, provision of education to the farmers and livestock keepers on postharvest handling. Also, enforcement of laws through regulatory board on level of aflatoxin in crops (1-15 (ug/kg) as Codex standard and engagement of modern techniques for screening of fungal contamination in Agricultural products prior to utilization.

The sixth presentation, Researcher explored the limitations of agroecological practices and how stakeholders' attempt to overcome them with a case of Uluguru Mountains Landscape in Morogoro Municipality, Tanzania. Key issues discussed include inadequate government commitments to manage agroecological practices to improve agriculture productivity without impairing environment/ ecology. Agroecology contributes to livelihoods of the farmers, but unregulated agricultural activities accentuate environmental degradation and destroy biodiversity. A mere protection of ecology without ensuring of livelihood benefits to farmers cannot be sustainable amidst lack of agroecology knowledge. Stakeholders and institutions related to agroecology should be identified and their duties toward

agroecology management become clear and obligatory, supported and monitored by lower-level government (wards/village). Local Government Authorities (LGAs), policies and regulations should not only recognize agroecology but also identify its key challenges, suggest possible solutions and exploring more opportunities to its sustainability. Agroecology should be clearly articulated in relevant policies and its related concepts introduced in the curriculum of ordinary and tertiary education.

In the presentation titled “Effect of tillage, pre-emergence and post-emergence weed control options on weeds, cassava growth and yield at kiimbwanindi village in Mkuranga, Tanzania” identified common available weeds in cassava and controlling options. The result concluded that the combination of till + ridges, application of pre-emergence herbicide (S-metolachlor + atrazine) and post emergence herbicides (glyphosate) can effectively control weeds and provided favorable environment for cassava growth and root formation as compared to other treatment options. Some issues emerged during discussion includes fewer sample representation in generalizing the results.

The last presentation focus on evaluating the extracts of C. swynnertonii (resins) and S. glaucescens (latex, fresh and dry leaves) for their efficacy against FoL. In the laboratory, a 4 × 4 factorial experiment in a Complete Randomized Design (CRD) was carried out to evaluate resins, latex, fresh, and dry leaves each in four concentrations (0.01 g/ml, 0.05 g/ml, 0.1 g/ml and 0.15 g/ml). it was revealed that The plants treated with dried leaf powder attained the highest height, the number of branches/plants, leaves/plant, and leaf area of 85.85 cm, 19.25,99.5 and 59.39 respectively. The findings benchmark the fungicidal potential of C. swynnertonii and S. glaucescens. Extracts from S. glaucescens had positive impacts on the growth and development of tomato plants. Plants which were growing in soils treated with extract of S. glaucescens were more vigorous than those growing on soils treated with the resinous extract of C. swynnertonii



3.3 Sub-theme III: Innovation for Human Development

Overview of the keynote presentation:

The presentation highlighted the key areas of innovation for human development. The emphasis was put on how human skill can be improved toward 4th industrial revolutions. Through the presentation, it was agreed that more efforts are required through the innovation ecosystems in order to unlock the potential and contribution of innovation to human development.

It was further explained that, in support of innovations for human development in Tanzania, COSTECH has established two programs for youth, women and entrepreneur for nurturing and supporting ideation and technology development. The role of COSTECH in supporting innovations were explained as follows:

a. COSTECH has Buni Hub for ideation and is the place where innovators can make quick fabrications. Also, Buni conducts accelerations and intern programmes.

b. COSTECH has also DTBi where incubations and mentorships of prototypes are conducted to come up with Minimum Viable Products. Along with that, Buni and DTBi work to support intermediaries in other institutions to widespread the knowledge and for easier support of the innovation in their areas.

c. COSTECH has different programs such as Science, Technology, Engineering and Mathematics (STEM) and talent pool conducted under Buni Hub and DTBi where students from primary, secondary and university can join and learn more about STI. COSTECH has established Fursa Lab in Kijitonyama secondary school to empower students to come with innovations.

d. COSTECH identifies innovation through MAKISATU and as a walk-in innovators and so far about 2800 innovations have been identified and 283 innovations have been supported.

The type of support from COSTECH includes;

i. Linkages – where innovators are linked to relevant institutions to acquire or to get assisted in innovation development or certification authorities such as BRELA and COSOTA

ii. Seed funding – The small grants are provided to innovators to enable development or improvement of prototype to minimum viable products (MVP) that can access the market.

iii. Procurements of innovation equipment – COSTECH provides and assist purchase innovation enabling equipment.

Presenter explained recommended factors for consideration in attracting and investing much in STI and have strong innovation ecosystems in Tanzania were suggested, which includes;

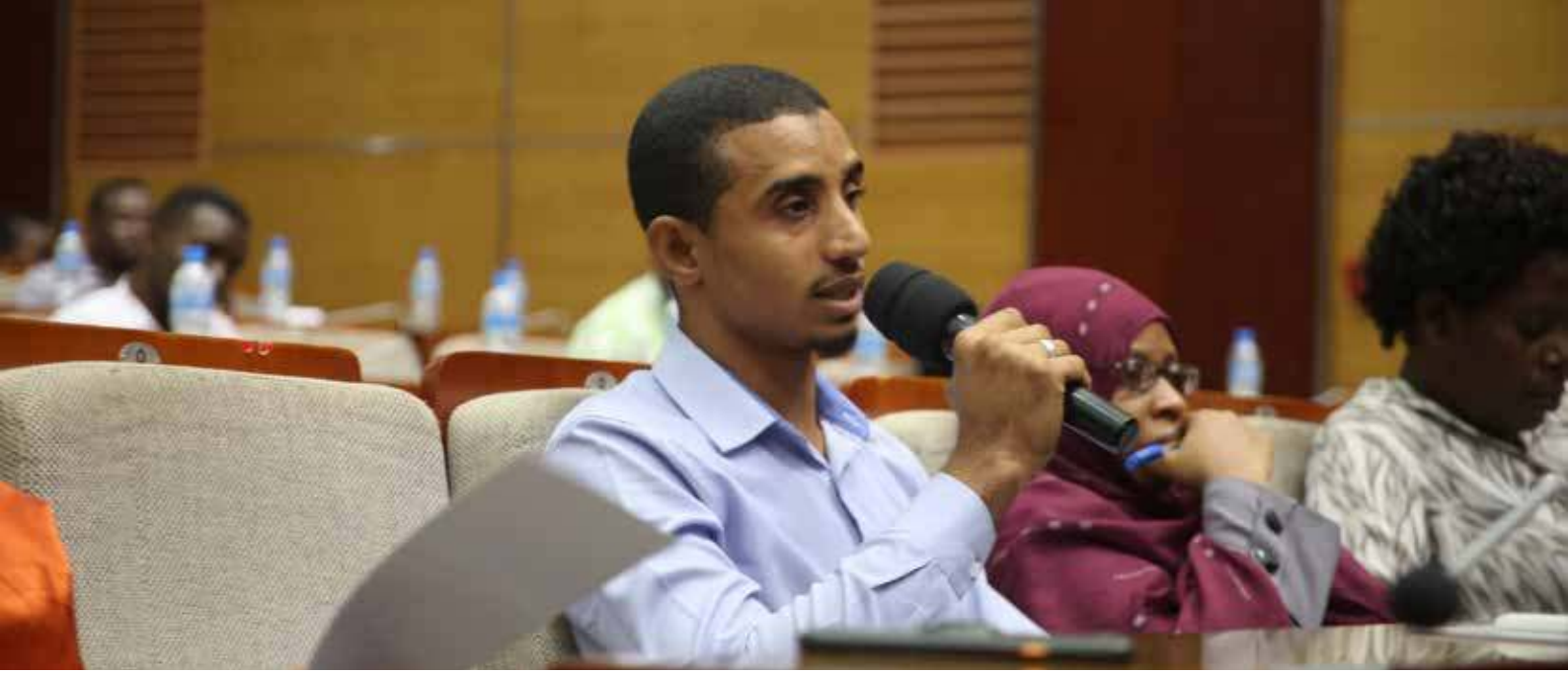
- 1st - Attract large amount of donor funds and invest in STI and interconnection of startups.

- 2nd - STI countries have their specific things to address especially those from talents and policies that support more exportation of technological products than importations.

- 3rd - Have a well-developed system that support STI

- 4th - Adopted a good ecosystems approach where Government, R&D, Universities and industries work together.

- 5th - Invest more in technology transfer from academia to industries.



Key issues emanated from the session that should be taken into the consideration to enable from Innovation for Human Development

1. Ownership of Innovation Data in different spheres of human development; investment in data acquisition and dissemination among different actors within innovation ecosystem.

2. Unveiling the potential of Zanzibar in the Innovation ecosystem basing on the number of startups that are emerging and the investment platform in the ecosystem within Zanzibar.

3. Consideration of innovation frameworks in the existing policies and decision making portfolios. This is based on the contribution of innovation to human development within and outside Tanzania.

4. Leveraging innovation support platforms within and outside Tanzania to avoid duplication of efforts in supporting technology development. The support criteria, focus and priorities should be unveiled for each platform.

5. Talent pool programmes should be initiated to facilitate talent growth among students and young generation. The reference of DTBi and Buni talent pool programmes should be simulated in other platforms.

Technical Symposia: Summary of Presentations, Discussions and Recommendations

The following papers were presented:

i. Unlocking The Economic Potential of Hyphaene Species Known as Mikoche in Tanzania (https://doi.org/10.37425/eajsti.v4i3.679) - Ms. Amina Ahmed

ii. Using Zero Energy Cool Chambers to Reduce Postharvest Losses in Fruits and Vegetables for Increasing Tanzanian Farmers Income - Dr. Proscovia Kamugisha

iii. FAT Advisory Tool for improved diagnosis and decisions in selecting appropriate insecticides for management of FAW - Prof. Gration Rwegasira

iv. Clinical benefit of MKANDA SALAMA KIT in a real-world population with PPH (https://doi.org/10.37425/eajsti.v4i3.715) - Dr. Paschal Kija

v. Innovative approach to mitigate aflatoxin and micronutrient problems in complementary foods (CFs) for health and economic wellbeing (https://doi.org/10.37425/eajsti.v4i3.703) - Prof. Bendantunguka Tiisekwa

vi. Smart TB: An Integrated Digital Patient-Centric Tool for Promoting Adherence to Treatment among People Living with TB in Tanzania (https://doi.org/10.37425/eajsti.v4i3.696) - Ms. Joan J. Mnyambo

vii. The Effectiveness of Dig Tech Platforms to The Development of Tanzania Women Innovative Startups in Arusha Region - Ms. Maria Lashau

viii. mitation and Innovation of Ideas, Inventions, Principles and Practices in Culture, Education, Science and Technology Lessons from Asia and Europe For Tanzania (https://doi.org/10.37425/eajsti.v4i3.709) - Prof. Emmanuel Nzunda

ix. Imitation and Innovation Strategies for improving Tanzania cross border e-commerce performance Lessons from China (https://doi.org/10.37425/eajsti.v4i3.706) - Dr. Akinyi Sassi

x. No More Death, No More Birth: A Novel Method for Rodent Management - Ms. Mwajabu Suleiman

xi. Use of Digital Technology to Access Continuing Professional Development: Case of Tanzania Health Workforce - Mr. James Kalema Imitation and Innovation of Ideas, Inventions, Principles and Practices in Culture, Education, Science and Technology Lessons from Asia and Europe For Tanzania

xii. Efficacy of place based innovated briquetting technologies for sustainable cooking and heating energy in Tanzania (https://doi.org/10.37425/eajsti.v4i3.710) - Mr. Petro Mwamlima

During the presentations the following issues were highlighted:

The first presentation was highlighted on the economic potential of Hyphaene Species which also known as Mikoche in Tanzania. It was noted that these species were normally used as construction material for shelter, and its leaves are used to make woven products such as baskets, mats, and hats due to their strength and fiber length. Despite of this importance, the needs for further study was noted in order to explore fully potentiality of the species for future perspectives include its cultivation and marketing opportunities.

The second presentation was focused towards minimization of post-harvest losses in vegetables and fruits (perishable agricultural produce) by using the local available refrigeration. It highlighted disadvantages of post-harvest losses and the measures to mitigate the losses. The study further, highlights the stages where most losses occurs and the prevailing technologies to combat the effects. The technology includes the use of Zero Energy Cool Chambers in reducing post-harvest losses of perishable crops.

The third presentation highlighted the use of digital technology for blue economy by outlining the challenges in fishing industry and how to control through digital innovation such as mobile, GPS, Satellite. The presentation further outlined the advantages of using digital innovation technologies, these include; allocation of the potential fishing areas (PFZ), Earth observation and the fishing industry; Digital fish market and Management dashboard for web- based technology.

The fourth presentation described the potential use of MKANDA SALAMA KIT among the women at the age of 13 – 39 as a new innovated technological device designed to stop Postpartum hemorrhage (PPH). Based on Tanzania administrative data and policy Implication report of 2018, revealed that PPH contributed to about 29% of all maternal deaths in Tanzania. Therefore, it was noted that the combination of MKANDA SALAMA with MSK can be effective in reducing the bleeding in women. However, MKANDA SALAMA is important since can be used by anyone because do not require advanced knowledge to use.

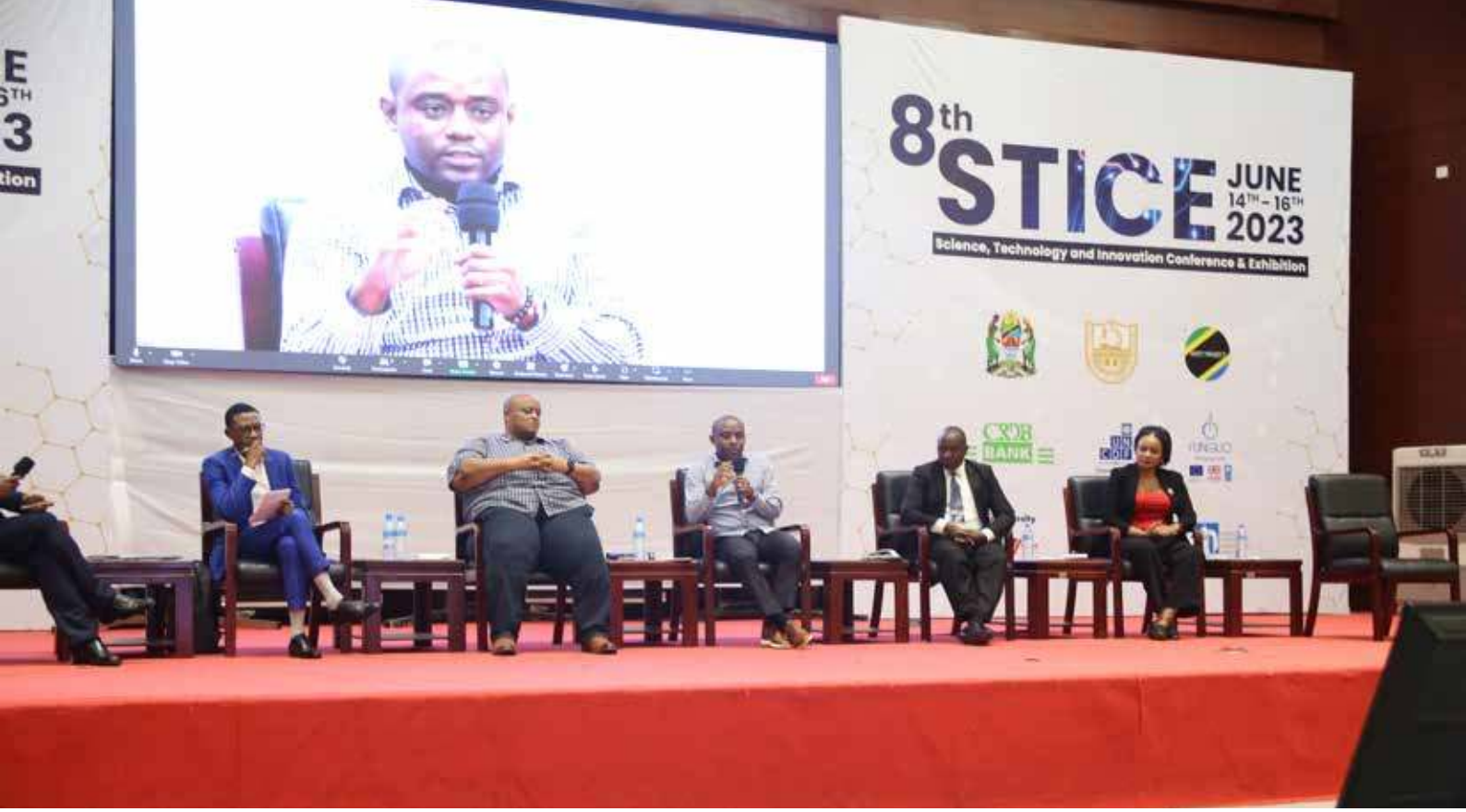
The firth presentation highlighted on the risks of aflatoxin exposure and complementary food. It explored the global case and narrowed down to East Africa region and finally some regions of Tanzania where the aflatoxin condition is critical. Further, it mentioned the effect of aflatoxin implications and approaches to overcome the aflatoxin. The presentation also outlined the possible solutions for formulating foods or products that contains free aflatoxin ingredients that is acceptable at a nation.

The sixth presentation outlined the main challenges that faced majority of on tuberculosis patients in Tanzania to drop using TB medications and consequently, led to transmission of disease. This brought up a need to develop a digital smart TB in order to address the challenges. The system can be able to send message that alerts the patients who missed the clinics to attend it. It was noted that the systems will be able to connect TB patients and Directly Observed Therapy (DOT) nurse through an integration of Smart TB with other healthcare systems in Tanzania for efficient TB management.

The seventh presentation aimed at identifying factors that enabled China to excel in E-commerce and use findings to improve the Tanzania E-commerce. The presentation elaborated the concept of E-commerce as well as providing the context of E-commerce in Tanzania and China by identified factors for a lead for successful E-commerce approach. Those factors are such as good policy, infrastructure and Inter collaboration among E-commerce partners. Moreover, it was explained that E-commerce has various advantages, among others include cross border trade opportunity. Therefore, it was recommended for establishment of a national strong policy that will guide and provide friendly environment to E-Commerce trades

Eighth presentation focused on manufacturing a briquet making machine and finding factors that determine the acceptance of the products. Specifically, study intended to switch the use of energy from charcoal to briquet by enhancing briquet adoption and use to the Tanzanian population. The focus was to have a cost efficiency and sustainable cooking technology for sustainable community use.

Lastly, presentation intended to promote an integration of people with disabilities in 4th IR aimed is to ensure inclusivity. The presentation emphasized that technology and innovations should solely focus on helping disabled to interact with ICT facilities in the era of 4th IR. It was noted that people with disabilities are excluded in interacting with various technologies. Therefore, it was recommended to ensure 4th IR is considering the needs and interests of the disabled are accommodated to ensure inclusivity of all groups.



3.4 Sub-theme IV: Role of Biotechnology towards 4th Industrial Revolution

Overview of the keynote presentation:

In presenting the concept of contribution of Biotechnology towards fourth industrial revolution, the presenter explained that 4th industrial revolution already exists though application in Tanzania is very low. Humanity has been facing its challenges all over the world, such as a mismatch between population growth (increase) and limited food production. In Tanzania, population has reached 61 million in 2022 and it is expected that by 2050 the population will reach over 100 million people while the production area remains the same. In addition, with the current trend of mobility by 2050, 60% of the Tanzanian population will have shifted to live in cities. Other than population there are other challenges that Tanzania faces which include climate change, floods, pathogens, and energy crisis.

In 4th industrial revolution is not only human being is providing solutions and changes but also human being part and parcel of that change (People are changing in behavior). The characteristics of the 4th industrial revelation are that, humans and digital have a part in changing the system.

The presenter also defined what biotechnology is; types of biotechnology and chronology of biotechnology where in 2003 there were a project that understands different diseases and where they come from. The presenter cited examples of use of biotechnology for changing such as those in health, agriculture and industry sectors:

Health

1. Types of modern molecular biotechnology which includes gene editing, genetic engineering and genome sequencing

2. Application of biotechnology in health-production of recombinant DNA e.g. Production of insulin, hepatitis B, Covid19 vaccines etc. in which it gives the precision information on who is sick rather that what disease-specialized medicines means one will be treated as per DNA

3. Other technologies include neuro-stimulant, pacemaker, foot drop stimulator

Agriculture

Plant biotechnology provides technologies that can be used to diagnose diseases, technologies that increase resistance of the crops to different diseases, crops that are resistant to drought, improve nutrition (added beta-carotene in rice), rapid growth for salmon fish, use of gene editing to improve resistance to diseases, detection of diseases, aflatoxins.:

Industry

Taking several traits from different organisms and transfer to one organism for production of different products e.g. What is being done in-synthetic biology. In the production of morphine. In conclusions, the presenter discusses about challenges facing modern biotechnology, which includes ethical concerns.

Discussants of this presentation discussed on the possibility of Tanzania to integrate the application of biotechnology in National health system; use of the genetic editing for treatment giving an example of research what are being carried out in America which shows that it is possible but very expensive. Use of biotechnology can reduce the cost as it had been done in the production of anti-malaria drugs such as artemether-lumefantrine (dawa ya mseto).

The issue is not only increase in number but life expectancy will increase as technology advances so increase the need for more food that is safe and nutritious e.g. in Tanzania cassava can be produced with improved nutrients contents in sustainable way. Instead of normal way food production, more environmental friendly chemicals can be applied to produce food with nutrients e.g. Use of bacteria for production of different multivitamins, and minerals in (synthetic biology) e.g. production of vitamins. For example, all the insulin used in the world comes from GMOs production using chemicals; biotechnology can be used to produce.

Another presenter explained the use of gene editing to transform a mosquito who cannot transmit malaria; vaccines such as monoclonal antibodies that were screened to be the best, used it to develop vaccines which is the best for prevention of malaria which means when you give vaccine to a person.

Food security

Access to safe and access to nutritious food need infrastructure and funds to facilitate biotechnology research and human resource. Though there are ongoing research on cassava, we haven't done a lot on molecular pharming, if we can program the crops to produce nutritious food we can partly suffice the food security needs.

The discussants spoke on various issues including: -

a. Strict liability was amended for research only other clauses remains the same; Tanzania policies support the application of biotechnology by following instituted policies and regulations

b. Not happy with GMO food but support GMO medicine-which are directly administered to people that is different perception and everyone is entitled to it.

c. Currently from agriculture there is no GMO in the market, the products that are available is a result from normal breeding techniques. Unfortunately, most of the breeding techniques when improving some traits, other traits might get lost on the way

d. Advise to awareness on biotechnology so as to increase understanding. Environment ACT and biosafety regulations put an emphasis on the same

e. In genetics there is some information/structure that will never change. This information does not change; the protein produces after consuming is impossible to change into RNA; so is the live virus/vaccines

f. There is a distortion on biotechnology information; scientists talk among themselves, stakeholder's engagement is very low, this needs to be improved but also lack of funds to facilitate research

g. There is a need of stem cell registry which needs a lot of funds for infrastructure and maintenance of the same

h. Tanzania needs a biosafety framework; the current has not touched well on new emerging modern biotechnology. It only focuses on agricultural biotechnology specifically, crop biotechnology; when it comes to genome editing in Tanzania we don't have guidelines for the same; Nigeria has very simplified guidelines; Kuka has to decide how we look, we need to regulate products/process.

i. Polio vaccine was using live agents; modern biotechnology is needed, instead of live you be given attenuated ones; or the metabolites.

j. If you sow a seed once, it will not grow again; the famous case with Monsanto and Pfizer; if he was able to develop them and have many, it is because it can be repeated; that technology exists terminator gene but until now it has never been used.

k. Differentiate between technology company and technology; let's associate technology with products/ keep technology that is free, produce it yourself and use it yourself; systems that can be used to prevent the challenges and use the benefits derived from biotechnology.

Key issues emanated from the session that should be taken into the consideration to enable Role of Biotechnology towards 4th Industrial Revolution

1. As the world is changing, Tanzania might not be able to run against application of biotechnology, hence awareness to policy and decision makers and public about the importance of biotechnology in all sectors is important.

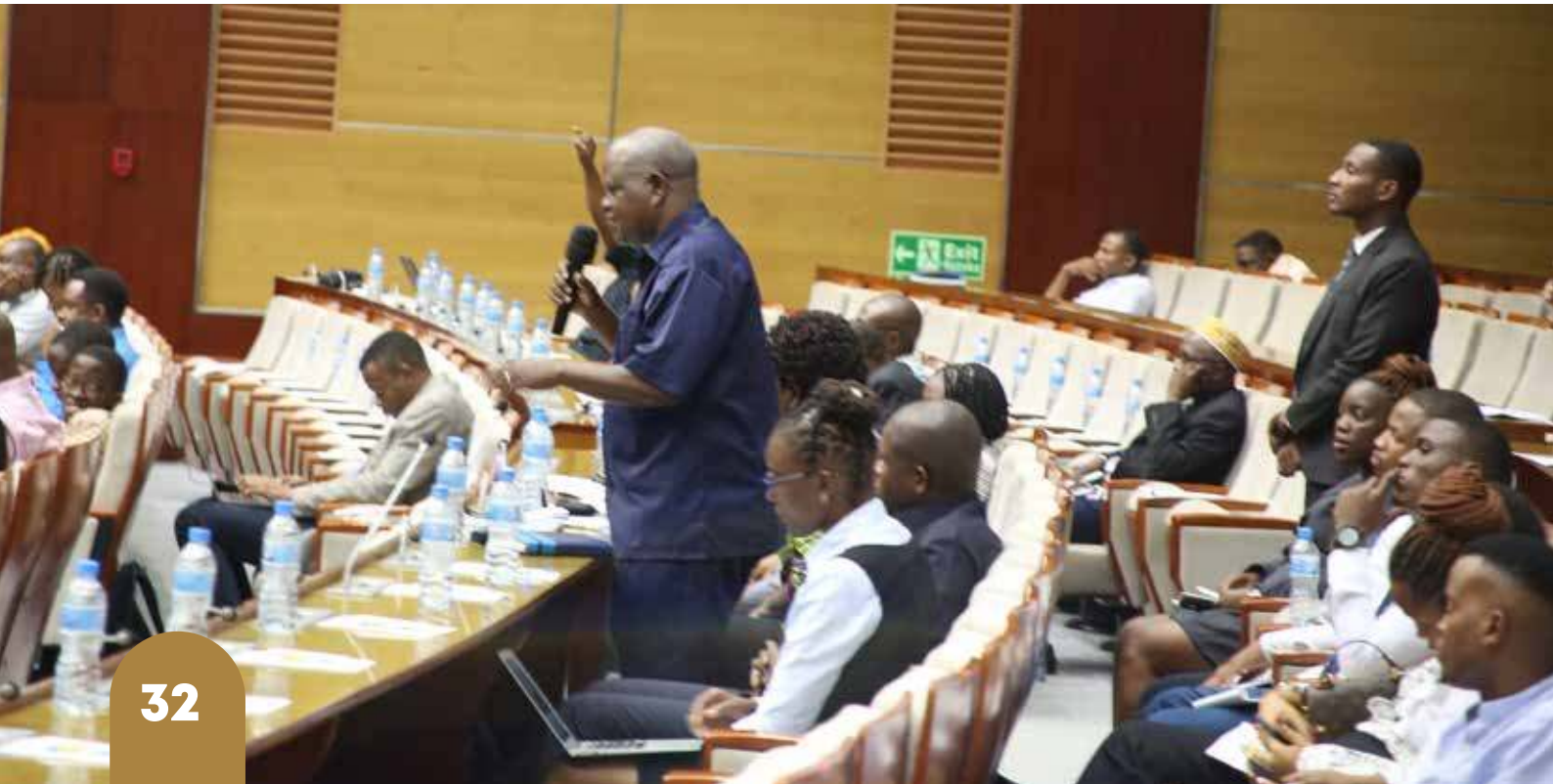
2. Tanzania has to strengthen the policy and regulations that guide the use of Biotechnology applications in different sectors.

3. The country has to prioritize research funds on Biotechnology researches

4. The country has to instrument laws and regulations for data protection emanated from biotechnology researches

5. Tanzania researchers are encouraged to collaborate with other African researchers to solicit funds for Biotechnology researches

6. The government has to establish governing laws that will moderate the research and use of genetic engineered and gene editing products



Technical Symposia: Summary of Presentations, Discussions and Recommendations

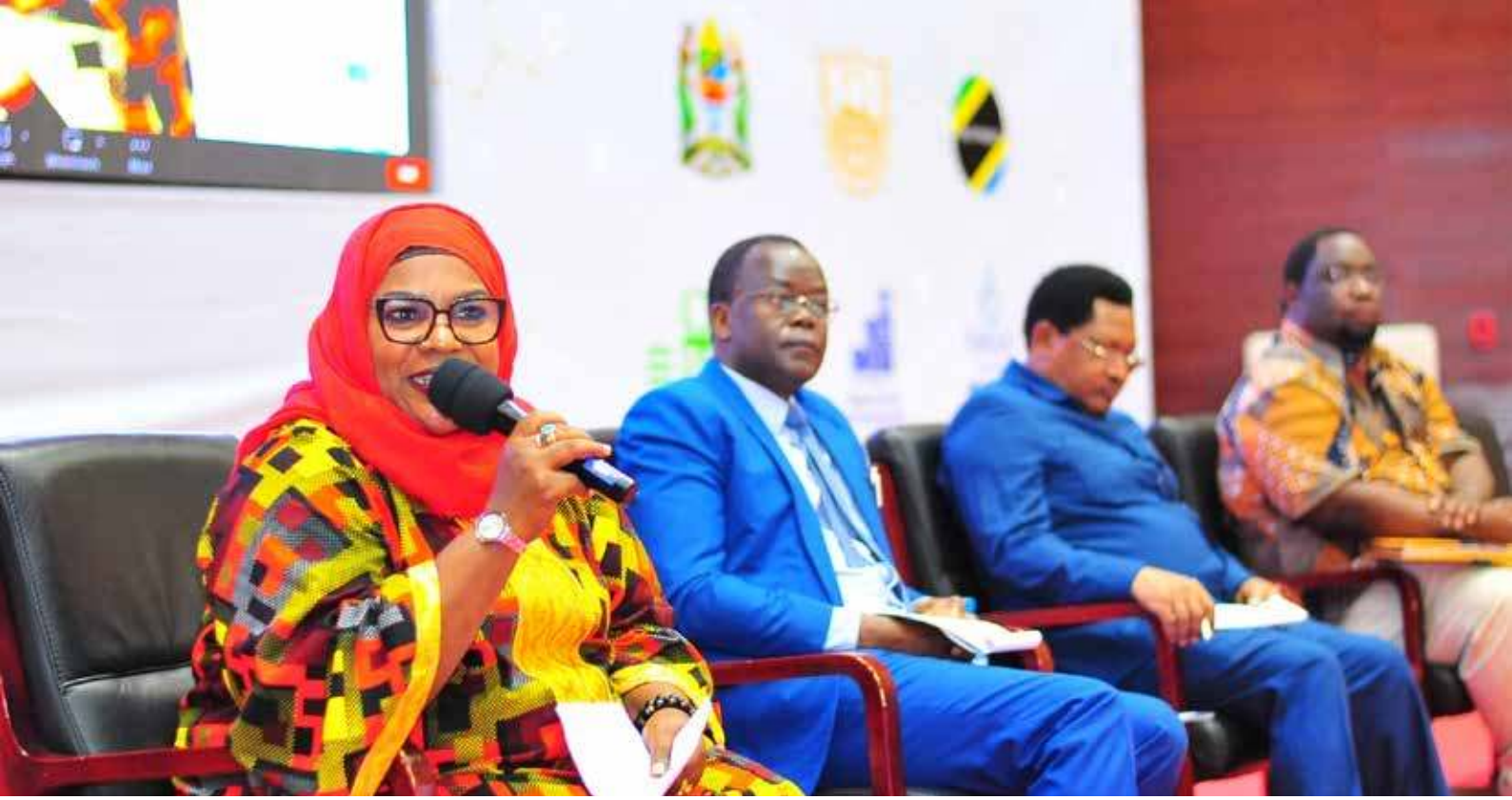
The following papers were presented:

i. Genome-Wide Association Study of Seed Multi-Traits in Common Bean (*Phaseolus vulgaris L.*) - Dr. Papias Binagwa

ii. Screening for resistance of the common bean genotypes to common bacterial blight, and bean common mosaic and necrotic viruses (https://doi.org/10.37425/eajsti.v4i3.716) - Mr. Nuhu Mbwebwe

iii. Elucidating the Effect of Genotype x Environment Interaction and Storage Time of Selected Common Bean (Phaseolus vulgaris L.) Genotypes on Cooking time (https://doi.org/10.37425/eajsti.v4i3.693) - Mr. Adrian Mvile

iv. Assessing the effect of sample storage time on viral detection using a rapid and cost-effective - Mr. Geofrey Sikazwe and Deogratius Mark CTAB-based extraction method



7.5 Sub-theme V: Contribution of Traditional Knowledge in STI development in Tanzania

Overview of the keynote presentation:

The presenter started by highlighting that Traditional Knowledge (TK) is a source of innovation both within the local context of TK communities and outside. In developing countries, often divergent knowledge systems coexist: TK systems and science based knowledge systems. Innovation policies in developing countries should integrate and promote knowledge exchange between systems for economic growth and respond to particular problems of development and local needs. Knowledge exchange across systems requires supportive institutions. Modern medicines for instance was modified from traditional medicines. TK have evolved from generations and plays a crucial role in human development.

The discussants spoke on various issues including: -

a. Communities and researchers need to be supportive and positive on Traditional Knowledge.

b. Traditional Knowledge should be embraced and promoted.

c. Conservation strategies for traditional endangered plants should be prioritized by the Government for sustainable utilization.

d. The Institute of Traditional Medicine at MUHAS invites Traditional healers every year and provide them training to improve their products and services.

It was concluded that, Indigenous peoples and local communities hold highly specialized traditional knowledge and technologies, rooted in local ecosystems, that have been shown to be beneficial to the advancement of modern knowledge and technology. Through TK a lot of modern innovations have come up. Traditional housing and architecture, food systems, navigational and resource charts, taro pits, water harvesting techniques, and land extension processes are invaluable forms of traditional knowledge and technologies. TK need to be embraced and promoted for the advancement of STI. Researchers need to do more research on TK and promote utilization of TK Communities should be positive and proud of our TK.

Science is the pursuit of knowledge. Approaches to gathering that knowledge are culturally relative. Indigenous science incorporates traditional knowledge and Indigenous perspectives, while non-Indigenous scientific approaches are commonly recognized as Western science. Together, they contribute substantially to modern science. Indigenous perspectives are holistic and founded upon interconnectedness, reciprocity and the utmost respect for nature. Both Western and Indigenous science approaches and perspectives have their strengths and can greatly complement one another.

Key issues emanated from the session that should be taken into the consideration to enhance the contribution of Traditional Knowledge in STI development in Tanzania

1. The government, through COSTECH, should increase funding for research and development projects, including research related to Traditional Knowledge, as well as promote the up-scaling of research results to support the growth of the country's industrial economy.

2. There should be a system or institution to assist the government in coordinating institutions and individuals involved in research and other activities related to Traditional Knowledge, bringing together experts to facilitate collaboration in fulfilling their responsibilities and increasing efficiency.

3. The government, through relevant authorities responsible for overseeing matters related to traditional knowledge in the country, should help educate the public about the importance of utilizing traditional knowledge as medicine and other natural practices, with the aim of addressing various challenges within our communities and promoting community well-being and sustainable living.

4. COSTECH should assist in coordinating the establishment of a comprehensive database of all information related to indigenous knowledge in the country, including medicinal plants and other relevant data. This database will aid our experts in conducting various research projects, and policymakers in making decisions related to such knowledge.

5. Practitioners of traditional medicine in the country are advised to consider the following key aspects before providing medicine to users: safety, ***quality, correct dosage, and efficacy of the respective medicine, as well as environmental hygiene.*** The goal is to contribute to the protection of consumer health.

6. It is recommended to establish close collaboration between experts in Traditional Knowledge from research and development institutions, higher education, and traditional practitioners in various districts throughout the country, with the goal of providing these traditional experts with additional scientific education and knowledge to improve their products and services, enabling them to compete in domestic and international markets.

7. The government should support the growth and development of entrepreneurship, including assisting in the establishment and development of business incubations run by experts in traditional knowledge.

8. Students are encouraged to study science and mathematics subjects to increase the number of experts in Traditional Knowledge who can contribute to the country's economic growth and development.

9. Stakeholders in Traditional Knowledge are encouraged to exchange knowledge and experiences among government experts, international companies, civil society organizations, and local private sectors to promote expertise and facilitate the development and transfer of technology.

Technical Symposia: Summary of Presentations, Discussions and Recommendations

The following papers were presented:

i. Blending traditional and modern knowledge in developing a natural language processing chatbot for knowledge sharing - Ms. Pamela Chogo

ii. Effect of harvesting stage on postharvest quality of black pepper (piper nigrum l.) cultivars grown in Morogoro. (https://doi.org/10.37425/eajsti.v4i3.701) - Dr. Ramadhan Majubwa

iii. Beyond Food Preparation: Potential of the Field of Food Science and Technology in Tanzania and Beyond (https://doi.org/10.37425/eajsti.v4i3.698) - Ms. Amina Ahmed

iv. Isolation and elucidation of antibacterial compounds from roots and stems of Synadenium glaucescens Pax (https://doi.org/10.37425/eajsti.v4i3.669) - Dr. Frank Rwegoshora

v. Pre-sowing treatment to improve seed germination and seedling growth of Commiphora swynertonii (Burrt.) and Synadeni um glaucescens (Pax.) - Dr. Richard Madege

vi. Consumers knowledge and practices on pesticide residues reduction in tomatoes in Mvomero, Morogoro region, Tanzania (https://doi.org/10.37425/eajsti.v4i3.700) - Ms. Sambwe Fundikira

vii. Quality of Propolis from Phytochoria of Tanzania Based on Antioxidant and Antibacterial Properties - Mr. Stanslauss Lukiko

viii. Development and Profiling of Affordable and Nutritionally Optimal Pigeon Pea- Based Products for Improved Recipes Diversification in Rural Communities in Tanzania (https://doi.org/10.37425/eajsti.v4i3.704) - Dr. Zahra Majili

ix. Knowledge and Perceptions on Overweight and Obesity among Adults in Same District, Tanzania (https://doi.org/10.37425/eajsti.v4i3.707) - Ms. Emanuela Massawe

x. Production of citric acid from banana peels using fungus Aspergillus niger - Ms. Isabella Luanda

xi. A Hub of Food Amid of Nutrition Insecurities: Exploring Food and Nutrition Situations in Rural Areas of Tanzania (https://doi.org/10.37425/eajsti.v4i3.699) - Dr. Hadija Mbwana

xii. Social Network Analysis and Stakeholders Influence on Moringa Plant Development Potential Mpwapwa District, Tanzania (https://doi.org/10.37425/eajsti.v4i3.705) - Dr. Chelestino Balama

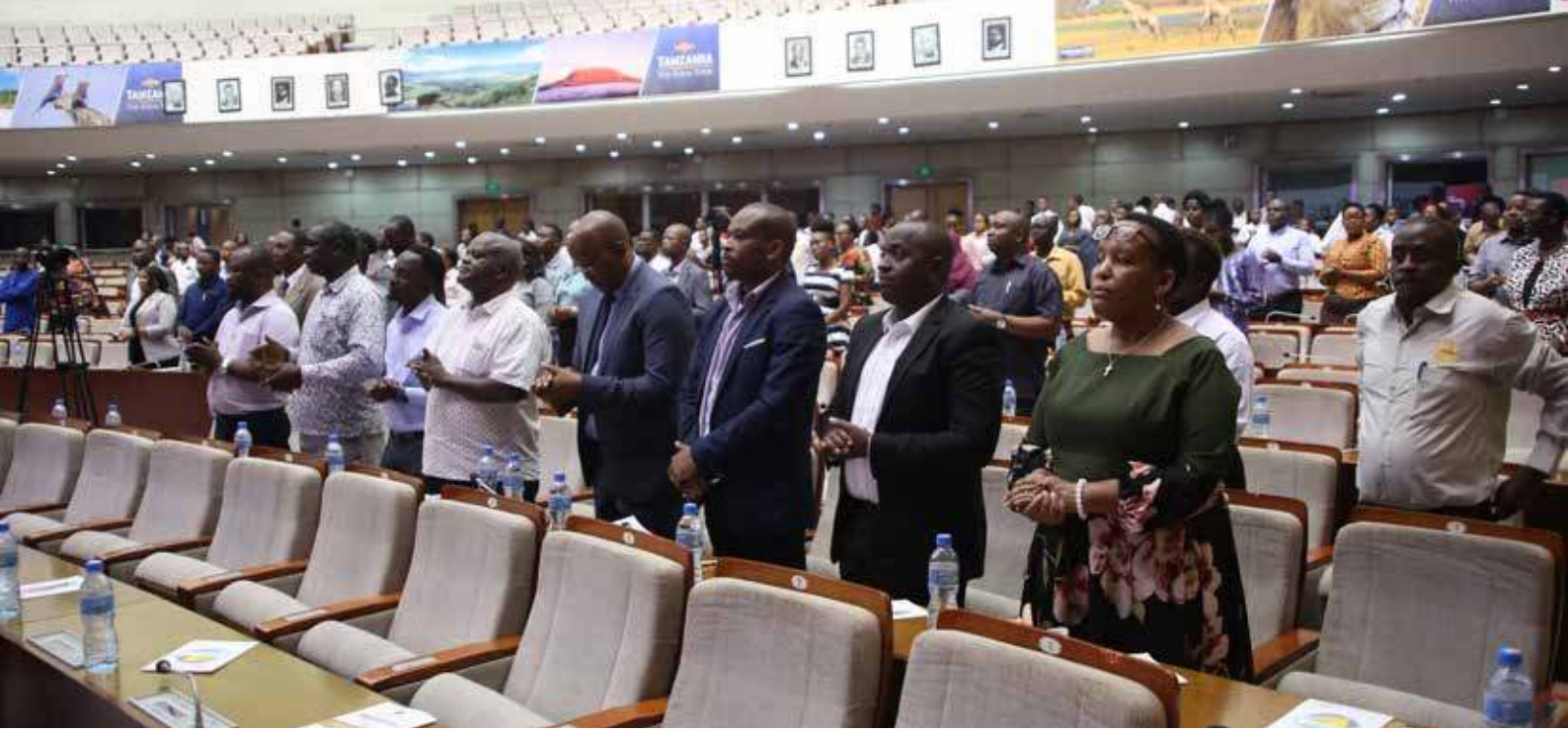
xiii. Beekeepers perception on arrangements used in supporting beekeeping activities in Tanzania - Mr. Allen Richard

xiv. Underutilized Oyster nuts (Telfairia pedata): Farmers knowledge, practices and utilization in Northern Tanzania - Dr. Philipina Shayo

xv. In-Vitro Efficacy of Botanicals Extracts for the Management of Aspergillus flavus Growth in Tanzania https://doi.org/10.37425/eajsti.v4i3.694 - Mr. Dickson Manyama

xvi. Fruit acidulants and storage conditions affect the physicochemical, microbiological and sensory characteristics of paneer (https://doi.org/10.37425/eajsti.v4i3.684) - Ms. Amina Ahmed

xvii. The effects of atoxigenic A. flavus co-applied with T. asperellum on the population dynamics of toxigenic A. flavus in the soil (https://doi.org/10.37425/eajsti.v4i3.695) – Mr. Gooddluck Tito



During the session the following issues were highlighted:

The first presentation focused on developing a natural language processing chatbot that will blend the traditional and modern approaches and practices on pre and post-harvest agricultural procedures. The developed chatbot will be used as an advisory tool to farmers and other stakeholders in the Maize value chain. Despite the usefulness, studies showed that the blending of traditional and modern knowledge has proved to be useful to enhance more productivity and can be duplicated. Therefore, the presentation revealed that a developed chatbot will be an effective tool for enhancing agricultural related decision making.

The second presentation aimed at comparing stages of harvesting the black pepper at a mature and premature stage. The findings revealed the moisture content, dry material recovery, percentage weight loss, berry firmness, minimum drying time and high weight loss.

The third presentation highlighted on investigation of Food Science and Technology (FST) concept, what is in and what is not. The results articulated the concepts, advantages and disadvantages and the role of food science in the development of science and technology particularly in areas of health, agriculture and community livelihood.

The fourth presentation intended to identify the medicinal compounds that found in the Synadenium glaucescens. The phytochemical results from roots and steam bark showed four compounds that have medicinal potential to be used as anti-fungal, anticancer, antibacterial and antiviral diseases these include hexacosane (G1), β-sitosterol (G2), octacosyl ferulate (G3) and hexacosanoic acid (G4).

The firth presentation highlighted on techniques for investigating the pre-sowing treatment that improves germination and seedling. The objective was to conserve the plant and protect it from overharvesting. The results showed that the treatment applied leads to significant improvement in germination and growth of the plant which roves the doorway to the possibility of cultivating the plant.

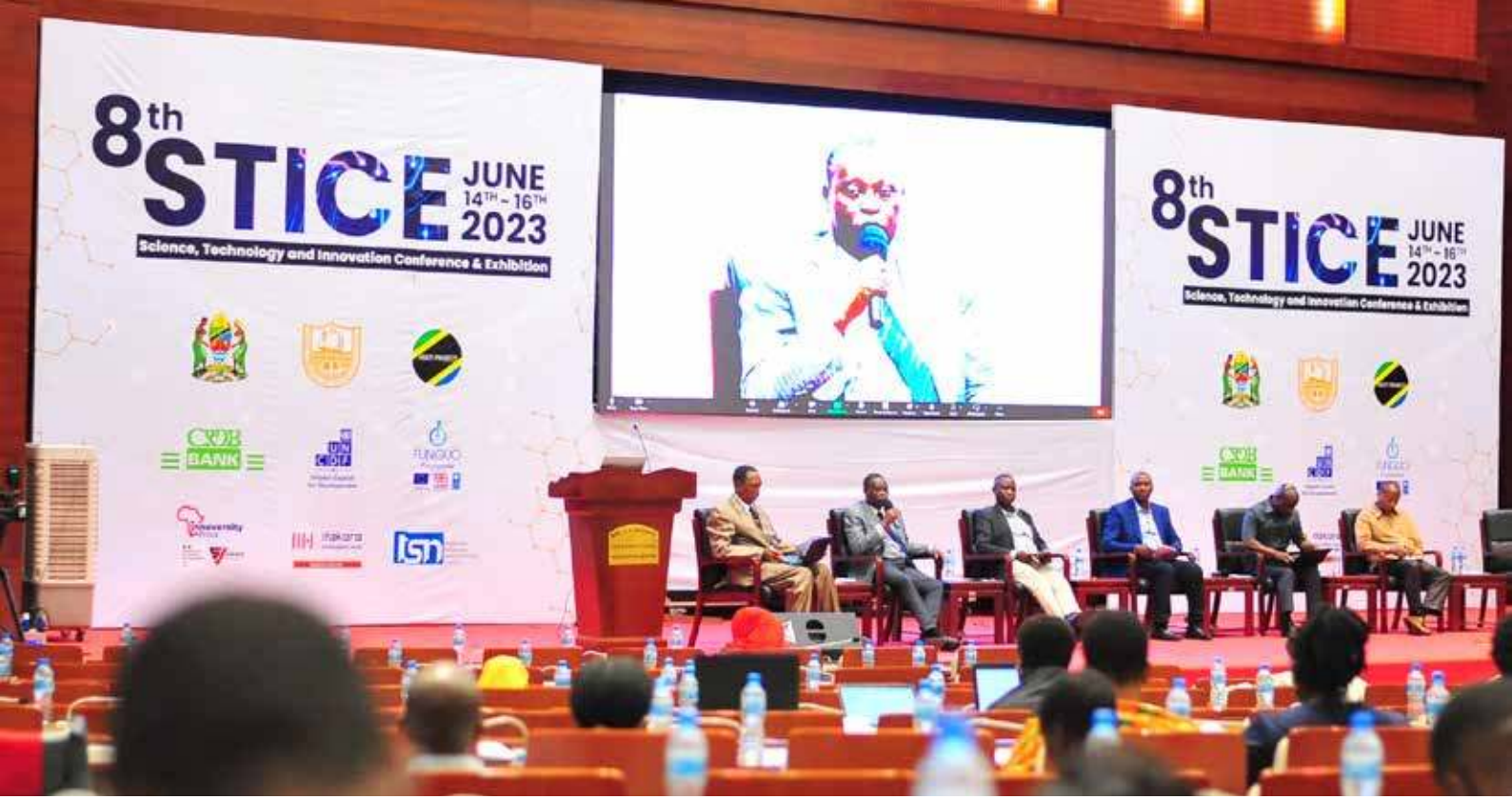
The sixth presentation focused on analysing level of understanding and practices of the consumers at Mvomero District in Morogoro on the reduction of toxicity level in tomatoes due to the improper use of pesticides. The study discovered that consumers have limited knowledge on health effects and practices for reduction of pesticide residues before consumption hence leads to high chance of exposure to health hazard. Therefore, the study recommended that there is a need to increase awareness creation on of food quality in order to improved the health of well - being while ensure food security.

The seventh presentation aimed at increasing the quality and quantity of propolis and awareness of their medicinal and economic potential. The study evaluated 50 samples collected from regions of Tanzania Mainland based Antioxidant and antibacterial properties. It was noted that the Tanzanian propolis is of high quality with effective free radical scavenging and antibacterial activities. Therefore, the study recommended that the propolis can be harvested for commercial purpose such as manufacturing of additive feeds and medicines for curing bacterial diseases.

The eighth presentation focused on determining the best combination of pigeon peas ingredients and developing products using pigeon peas and testing whether they can meet consumer needs. Results revealed that pigeon peas are rich in nutrients that can solve the existing gap of macro and micronutrients to improve livelihood.

The nineth presentation intended to improve the quality and shelf life of sugar cane juice for increasing its consumption and commercial opportunity in Tanzanian community. It was indicated that the cane juice has nutritional and medicinal potential include antioxidant, minerals and alike. The study recommended that the using of cost - effective improved technology such as CAD-CAM Inventor software of 90% extraction capacity during processing and packaging will increase quality and standards and enhance marketing competition.

The tenth presentation highlighted on causes that lead to overweight and obesity among adults aged of 25 - 55. The study revealed that high prevalence of overweight due to poor nutrition behaviour and perception among the people in the society. It was further revealed that obesity increases the high the risks of developing non-communicable diseases such blood pressure, cancer etc. Therefore, it was called upon health stakeholders to develop of appropriate interventions to reduce this burden.



3.6 Sub-theme VI: Open Science and Policy interface:

Overview of the keynote presentation:

The presenter started by highlighting that currently, STI is a common good and Open Science is not a choice but rather a must and therefore, it should be embraced by all. Other issues that the presented highlighted include: -

a. The presence of internet, various open source software's and open journal publishing systems has made it for people to publish extensively.

b. Open Science has enhanced research collaboration between south and north as well as east to west and hence reducing duplication of research.

c. Research results, especially those funded by public funds, should be published in journals that can be accessed by the general public because sharing/accessing of research results widens knowledge.

The discussants spoke on various issues which raised questions based on: -

i. The absence of the National Open Science Policy which will stipulate clearly if the local journals should be open or closed.

ii. The absence of the incentive mechanisms to reward researcher who publish in open journals

iii. The importance of having a regular platform that will be discussing issues to do with Open Science

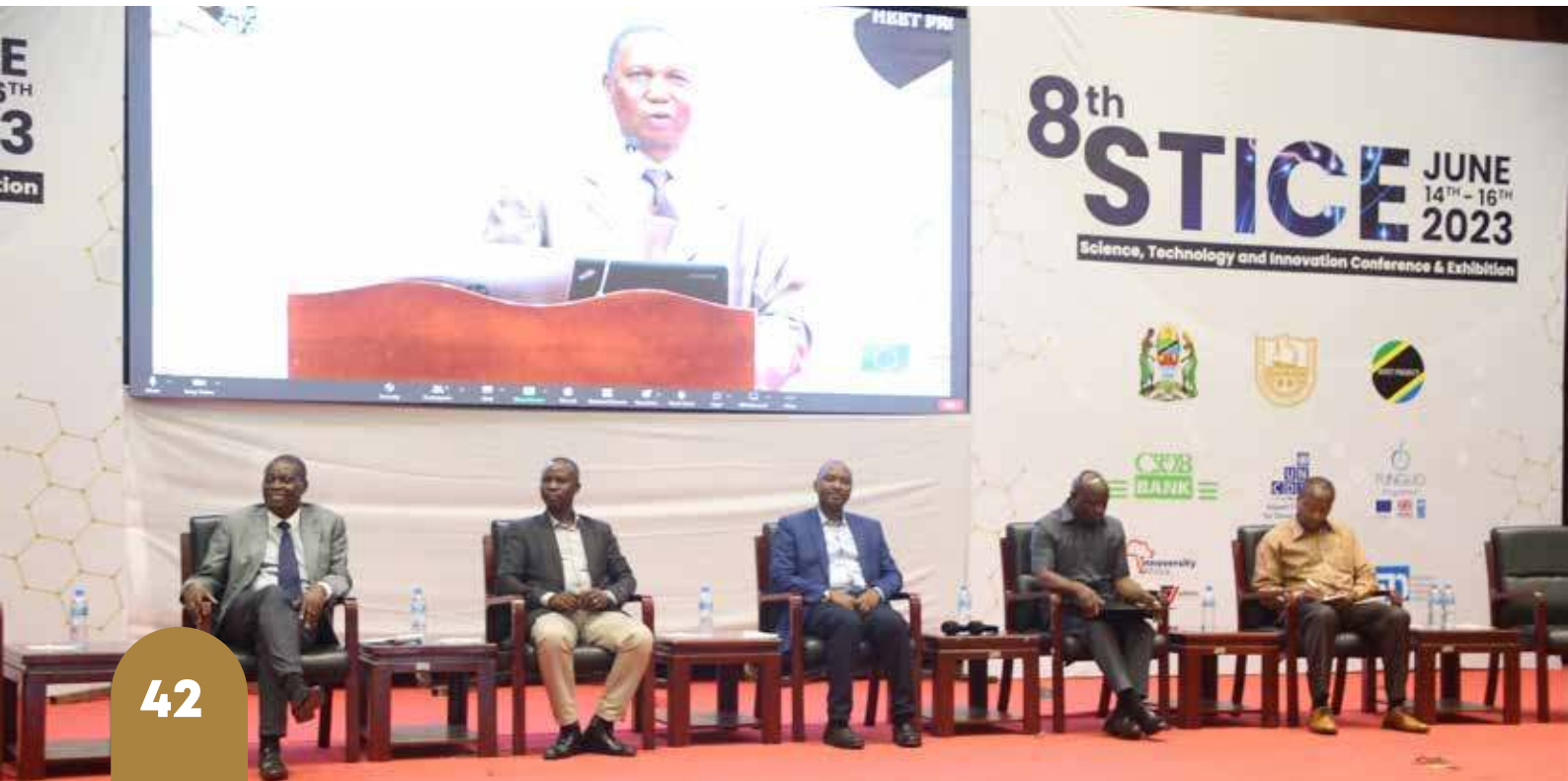
iv. The importance of having and extending a bandwidth with high speed internet connectivity that will allow citizens to access research information.

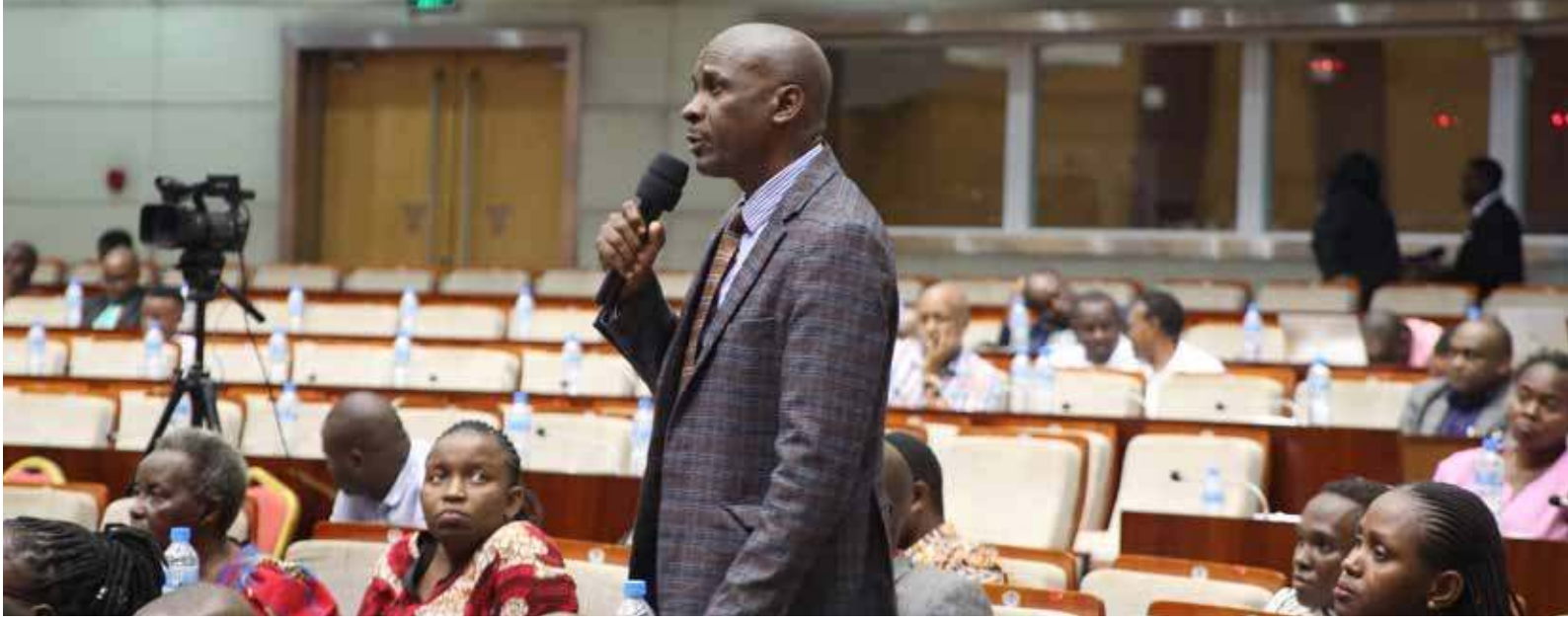
v. The importance of offering research synthesis courses and research knowledge products repackaging.

vi. The importance of the government institutions such as COSTECH, BRELA, & COSOTA to work together in protecting local inventors, innovator and researchers' patents

vii. The importance of the government to provide sustainable research and innovation funds so to enable continuous research and innovation undertaking in R&D and HL institutions.

viii. The importance of heads of R&D and HL institutions to encourage their employees to publish their research in the East Africa Journal of Science and Technology (EAJST).





Key issues emanated from the session that should be taken into the consideration to enable Open Science and Policy Interface

1. To establish a National Open Science Policy to ensure that research findings are accessible and utilized by everyone.

2. There should be a platform that promotes best practices in Open Science.

3. There should be a formal system to recognize and reward researchers who publish their research findings in Open Science journals.

4. Establish a National Research Network that enables researchers and innovators to share their publications/innovations to reduce duplication.

5. The government should consider improving the Copyright Society of Tanzania (COSOTA) by adding experts in Intellectual Property Rights (IPRs) and Patents, specifically in the field of Science, Technology, and Innovation.

6. The East Africa Journal of Science, Technology, and Innovation (EAJSTI) should be included in the promotion system for researchers who publish in the journal.

During the discussion, it was revealed that Tanzania has established some initiatives to support Open science which include the establishment of a National Integrated Repository located at COSTECH and the Institutional Repositories located in some of R&D and HL institutions.

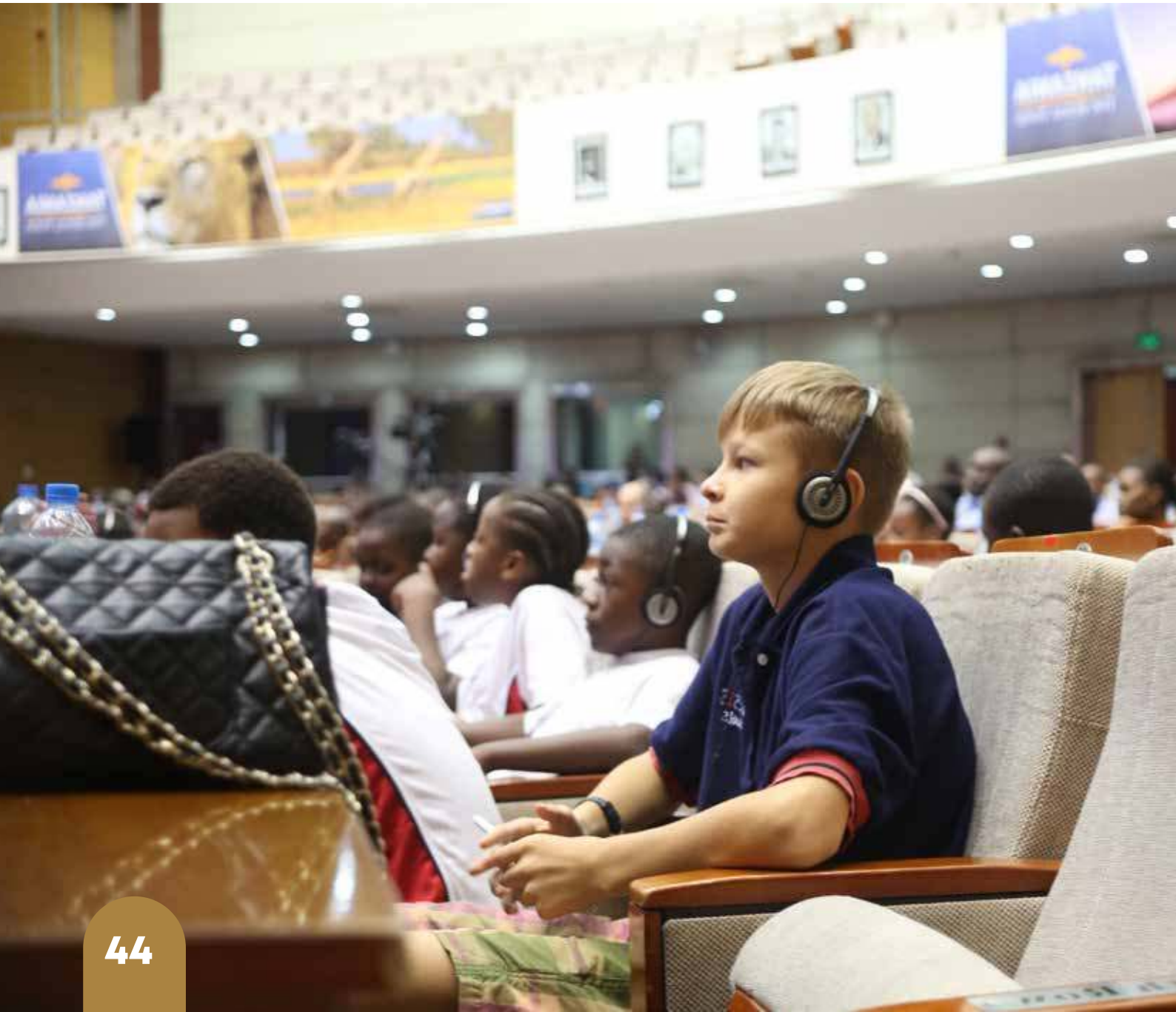
Technical Symposia: Summary of Presentations, Discussions and Recommendations

1. Measuring the Impact of Institutional Repositories in Selected Higher Learning institutions in Tanzania

2. Knowledge and practices of open science among scholars and researchers in Tanzania

3. Space Science for Technological innovation in Tanzania

4. Improving learning through classroom experiences in East Africa: Possible approaches for retrofits



1. **Knowledge and practices of open science among scholars and researchers in Tanzania - Dr Anneth Bella - UDSM**

It was presented that open science (OS) has been spreading rapidly among researchers with positive outcomes on accessibility of scientific knowledge. However, there is no clear evidence on the level of awareness and types of OS practices among scholars and researchers in Tanzania. It was further noted this has led to missing opportunity to reap the rewards of the movement to scholarly pursuits. The researcher further presented the findings of the survey done in the period of three months regarding the awareness of open science as follows; 144 scholars and researchers were interviewed, out of those 84% shows a high level of awareness of the term OS, about 69% of respondents were male while about 44% of respondents were early career professionals. However, respondents highlighted the barriers to spreading of the OS movement in the country including lack of awareness, knowledge and skills, the lack of institutional support and concerns over data security and ownership.

2. Measuring the Impact of Institutional Repositories in Selected Higher Learning Institutions in Tanzania (https://doi.org/10.37425/eajsti.v4i3.717) - Dr. Grace E. P. Msoffe

It was presented that Institutional Repositories (IR) development in Tanzania has made publications easily available, accessible, and retrievable. It was further informed that most of the Higher Learning Institutions (HLIs) in Tanzania have developed their IRs hosting institutional publications. She further presented the data from 2018 to 2022, on the assessment of the citation impact of IR in the four Tanzanian HLIs from the indexed database. The findings indicated that the Tanzanian IR contents had a low scholarly impact

Therefore, the paper recommended that, Tanzanian HLIs to devise strategies for increasing IR content visibility. The strategies may include registering the IRs in online platforms and to improve the accessibility of the IR content. Furthermore, the HLIs should create awareness about research visibility, enabling researchers to publish in highly reputable outlets and open access to increase their visibility.

2. Open Science and Policy Interface: The Tanzania Perspective (https://doi.org/10.37425/eajsti.v4i3.771) - Dr. Paul Muneja

The paper highlights the policy interfaces and frameworks that favor open science practices in research endeavors. Also, it provides a baseline for understanding the situation to inform scientific research and education communities about the status of open science and possible areas of intervention.

4. Space Science for Technological innovation in Tanzania – Dr. Noorali Jiwali

5.Improving learning through classroom experiences in East Africa: Possible approaches for retrofits - Ms. Xuzel Villavicencio

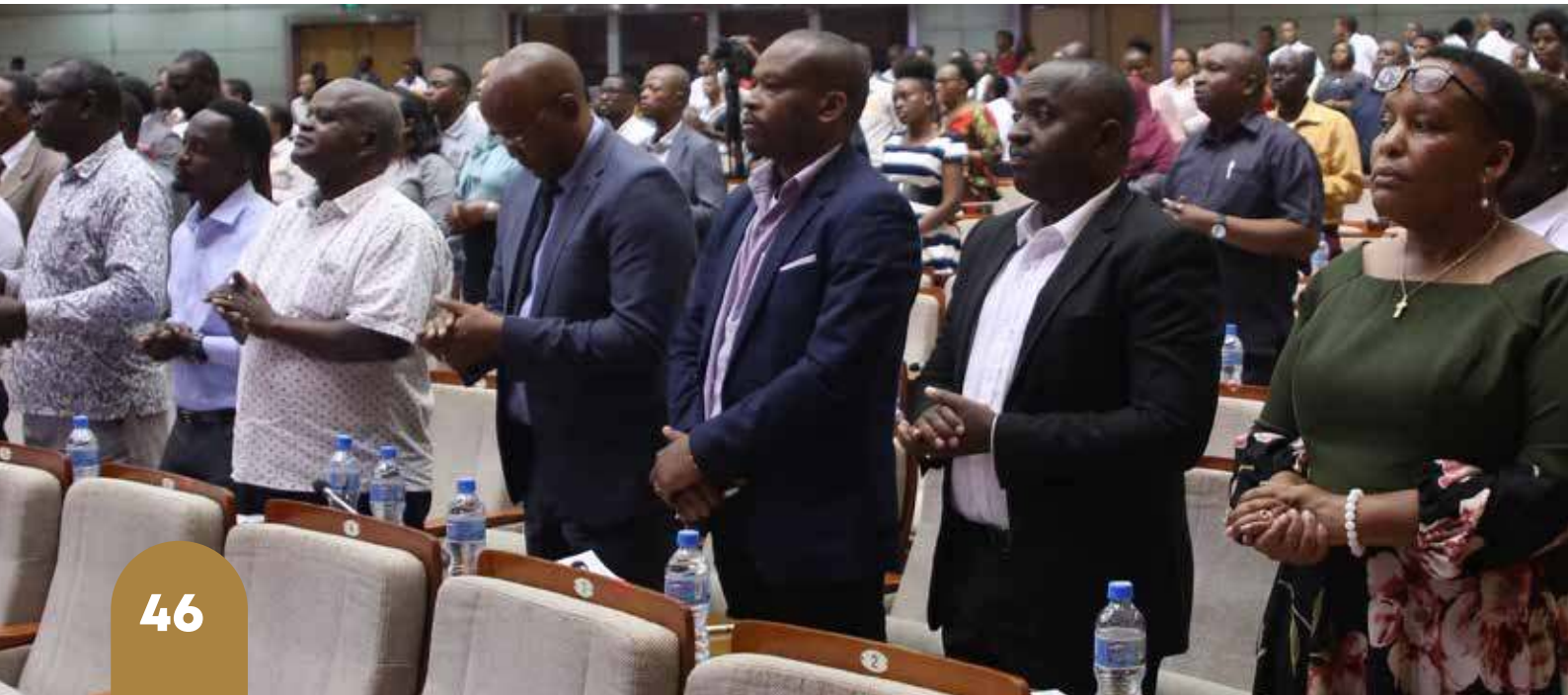
Below are the key issues raised on the two presentations

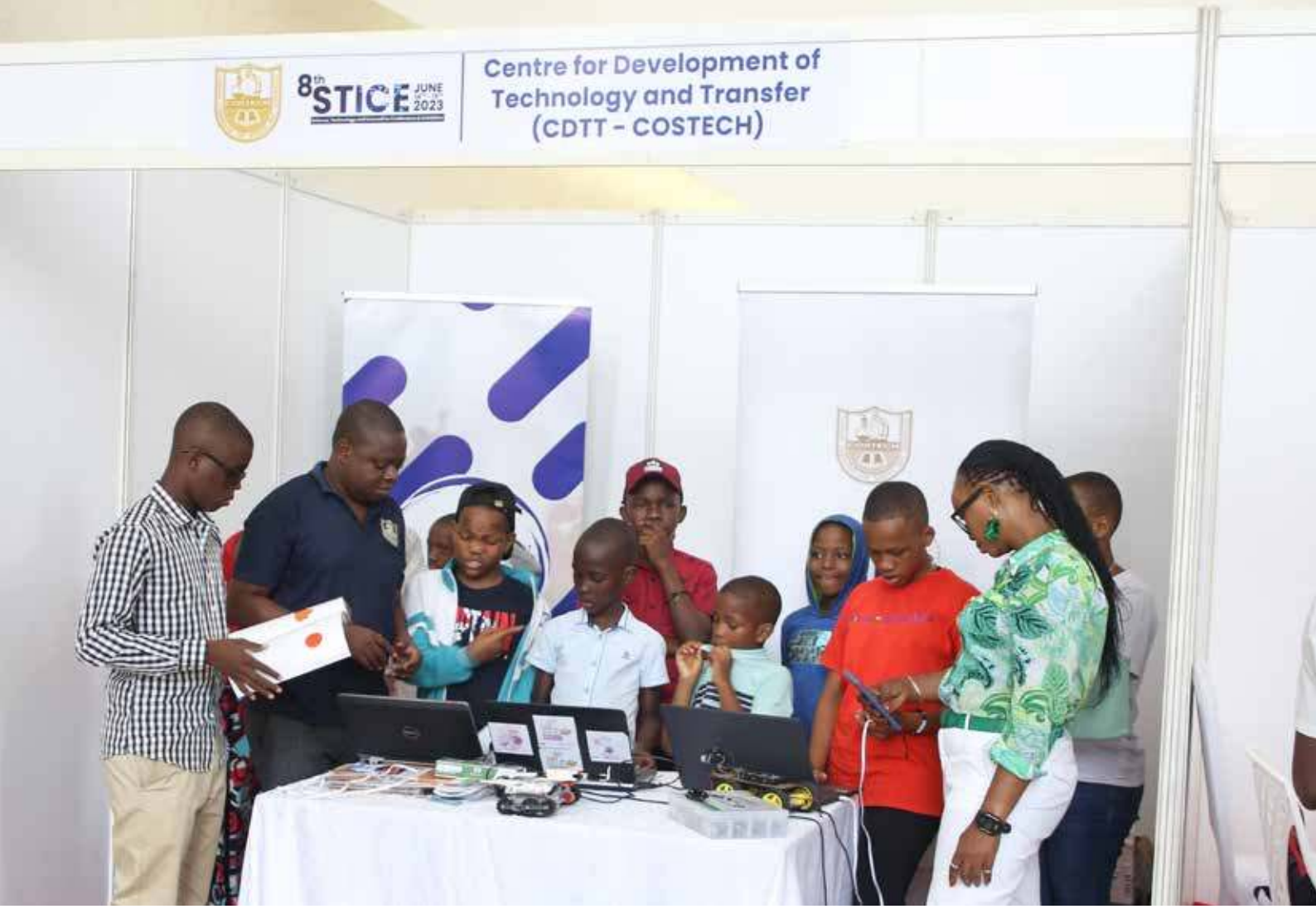
i. What other strategies have been put in a place to increase the use of institutional repository
ii. What type of infrastructure needed in order to have an optimal IR
iii. How open is the data and information shared within the repositories
iv. Are all data and information are being shared in the repositories
v. How do you compare Tanzania and other African countries universities in the use and promoting the repositories
vi. It was noted that most of the universities prefer publishing in the closed journal compare to the repositories

Recommendation from the two presentations

Although open science emphasize on making sure scientific research (publications, data, samples and software) and its dissemination is accessible to all levels in the society, its use in most of Tanzania R&D institutions is very low. Therefore, the following is recommended

i. Raise awareness on the importance of open science
ii. Put up strategies and mechanism to support open science initiative
iii. Continue to put up infrastructure to support open access initiative



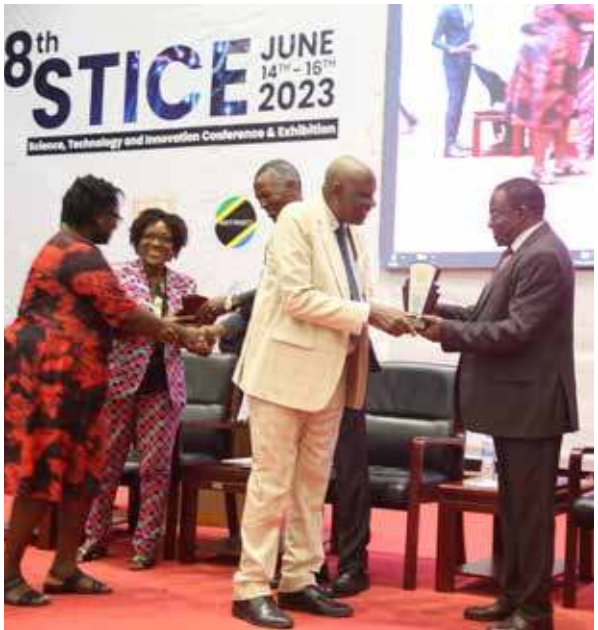


4. EXHIBITION

From the registration forms we learnt that thirty-eight (38) exhibitions from various institutions covering COSTECH overseen STI sectors like agriculture, ICT, Social Science, Public health, industry and energy, natural resources and the like were illustrated to the researchers and community in general.

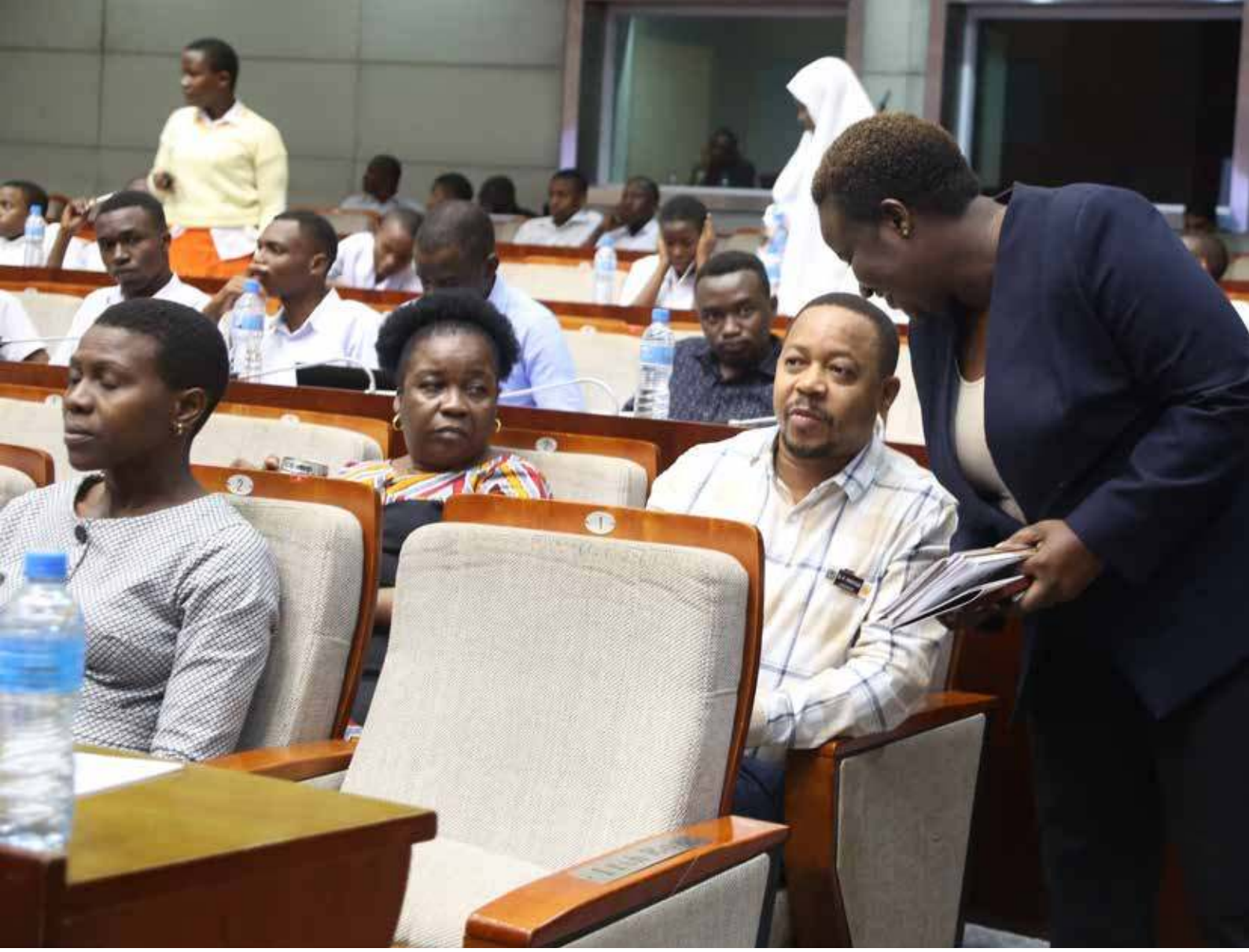
5. LAUNCHING OF STI BOOK AND AWARDS OF TROPHIES

The Guest of Honor was privileged to launch a book titled “Contribution of STI for socio-economic development”. In guidance and financial support from COSTECH, the book was written collaboratively with Ten Research Institutes including TaCRI, TORITA, TPHPA, TAFORI, TRIT, TAFIRI, TAWIRI, TALIRI, TVLA, and TARI. Chief Executive Officers and Representatives from these institutions were present during the official launch and were awarded with copies of these Books.



During the 8th STICE event a voting link for best paper presenters were created by ICT team and allowed conference participants to vote for all presenters per specific sub-themes. Two best paper presenters were identified per each sub-theme. The Guest of Honor awarded twelve (12) trophies the best paper presenters.

Sub-theme: Nation's Preparedness for the 4th industrial revolution		
S.No	**Name**	**Research Title**
1	**Dr. Anthony Kigombola**	Development of Blockchain Labs to Promote Blockchain Research and Innovation in Tanzania
2	**Dr. Cosmas Myanyi**	The Fourth Industrial Revolution and Persons with Disabilities: The Case of Digital Inclusion at the Open University of Tanzania
Sub-theme: STI for green, resilient and inclusive economy		
3	**Dr. Richard Madege**	Biofungicidal effects of *Commiphora swynnertonii* (Burrt.) and *Synadenium glaucescens (Pax.)* against Tomato Fusarium Wilt Disease
4	**Dr. Yasinta Nzogela**	Suppression of Root - Knot Nema- todes in Tomato *(Solanum lycopersicum)* and cucumber *(Cucumis sativus)* fields by using trichoderma and botanical pesticides
Sub-theme: innovation for human development		
5	**Dr. Paschal Kija**	Clinical benefit of MKANDA SALAMA KIT in a real world population with PPH
6	**Prof. Bendantunguka Tiisekwa**	Innovative approach to mitigate aflatoxin and micronutrient problems in complementary foods (CFs) for health and economic wellbeing
7	**Ms. Joan J. Mnyambo**	SmartTB: An Integrated Digital Patient-Centric Tool for Promoting Adherence to Treatment among People Living with TB in Tanzania
Sub-theme: Contribution of Traditional Knowledge in STI development in Tanzania		
8	**Ms. Pamela Chogo**	Blending traditional and modern knowledge in developing a natural language processing chatbot for knowledge sharing
9	**Ms. Amina Ahmed**	Beyond Food Preparation: Potential of the Field of Food Science and Technology in Tanzania and Beyond
10	**Dr. Philipina Shayo**	Underutilized Oyster nuts (Telfairia pedata): Farmers knowledge, practices and utilization in Northern Tanzania
11	**Ms. Isabella Luanda**	Production of citric acid from banana peels using fungus Aspergillus niger
Sub-theme: Open Science and policy interface)		
11	**Dr. Grace Msofe**	Measuring the Impact of Institutional Repositories in Selected Higher Learning institutions in Tanzania



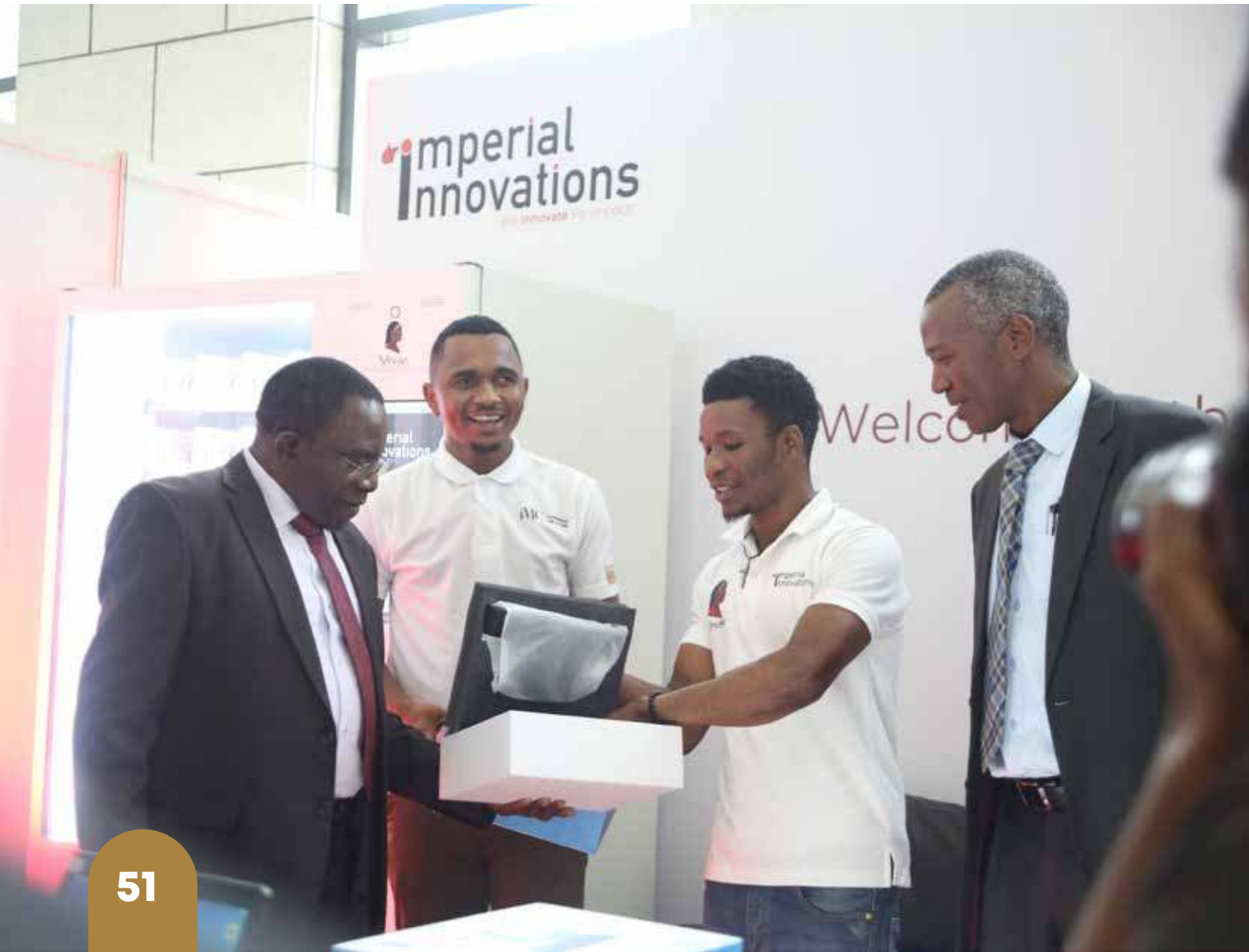
6. LESSON LEARNT

The 8th STICE provided unique opportunity for stakeholder to present and share their knowledge, skills, innovations and technologies in a way which would otherwise be impossible to achieve. In this year, the conference and exhibition have witnessed diversity among speakers in all six sub-themes. However, there is a need for improving diversity of speakers to balance international and national needs to broaden perspective and stimulate innovative thinking among the participants. In additional, engaging national leaders will provide unique arena for policy makers to contribute to STI for nation's sustainable development

We have evidenced unique interactive elements such as workshops, panel discussions, and Q&A sessions to encourage active participation from attendees. This promotes engagement, collaboration, and knowledge sharing among participants. One critical challenge was time set for each slot of a session. Hence, balancing schedule with time slot has been a challenge. Since the event is done once yearly, it is highly recommended to review the number of days to thoroughly meet the need of stakeholders.

The conference received number of STI products, however the turn rate for such products were minimum compared to the known innovations in the country. More effort is required to ensure maximum utilization of available STI products are showcased at the main STICE events. The approach accompanies with increasing collaboration and networking among stakeholders and further linking investors with innovators.

We acknowledge the importance of post-conference engagement and providing the feedback to attendees. Such approach will assure COSTECH receiving prompt feedback and set next conference in a way it becomes innovative and updated fashion.



Appendix I: The 8th STICE Program Book

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY

8TH ANNUAL NATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CONFERENCE AND EXHIBITIONS

THEME: Science, Technology and Innovation for Sustainable Development

PROGRAMME

14TH - 16TH JUNE, 2023

Julius Nyerere International Convention Centre,

Dar es Salaam,Tanzania

Organized by Tanzania Commission for Science and Technology (COSTECH)

8TH ANNUAL NATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CONFERENCE AND EXHIBITIONS

Master of Ceremony - Mr. Shaaban Kissu

PROGRAMME				
THEME: Science, Technology and Innovation for Sustainable Development				
14TH JUNE 2023: DAY ONE				
TIME	**SESSION**		**RESPONSIBLE**	
07:30- 09:00	Participants arrival, Registration and Breakfast		Secretariat	
09:00- 09:15	Introduction to Invited Guests		STICE Chairperson	
09:15- 09:30	Welcome Remarks		Dr. Amos Nungu - Director General COSTECH	
09:30 -10:30	**Plenary session I:** ***Dialogue***: Nation's preparedness for the 4th industrial revolution by 2050		**Moderator** Dr. Hassan Mshinda - Former DG - COSTECH **Discussants** • Dr. Jim James Yonazi (PS-PMO) • Prof. Lughano Kusiluka (VC–UDOM) • Dr. Siana Nkya (S/LECTURER-MUHAS) • Mr. Zahoro Muhaji (CEO-TSA) **Rapporteurs** • Dr. Hulda Gedion • Mr. Method Rutechura	
10:30 - 12:00	**Plenary session II:** ***Keynote presentation1***: Infrastructural readiness for the 4th industrial revolution ***Keynote presentation2***: Fintech for who? Demand forDigital financial services and fintech in Tanzania		**Moderator** Eng. Peter Ulanga - TTCL **Presenters** Dr. Ally Simba - EACO Ms. Aneth Kasebele - UNCDF **Discussants** • Prof. Simon Msanjila - UDOM • Dr. Joseph Ndunguru - TPHPA **Rapporteurs** • Dr. Philbert Luhunga • Dr. Wilbert Manyilizu	
12:00- 13:00	**LUNCH**		All	
TIME	**RUAHA HALL**	**MIKUMI HALL**	**SAADANHALL**	**UDZUNGWA HALL**
	Technical Symposia (Presentation of Research Papers)			**Side Event**
	Preparedness for Fourth Industrial Revolution	**Biotechnology 4IR &Green, resilient and inclusive economy**	**Traditional knowledge - I**	**PRESS ROOM**
	Moderator Dr. Ally Simba **Rapporteurs** • Dr. Hulda Gedion • Mr. Method Rutechura	**Moderator** • Dr. Siana Nkya **Rapporteurs** • Dr. Beatrice Lyimo • Dr. Wilbert Manyilizu	**Moderator** Dr. Prosper Massawe **Rapporteurs** • Dr. Samson Kambona • Mr. Clavery Makoti	
13:00- 13:10	**Dr. Zebedayo Kyomo** Developing Creativity and other Critical Skills for the Fourth Industrial Revolution among Secondary School Students in the Constructionist Learning Environment	**Dr. Papias Binagwa** Genome-Wide Association Study of Seed Multi-Traits in Common Bean (*Phaseolusvulgaris* L.)	**Dr. Hadija Mbwana** A Hub of Food Amid of Nutrition Insecurities: Exploring Food and Nutrition Situations in Rural Areas of Tanzania Abstract	
13:10- 13:20	**Dr. Anthony Kigombola** Development of Blockchain Labs to Promote Blockchain Research and Innovation in Tanzania	**Mr. Nuhu Mbwebwe** Screening for resistance of the commonbean genotypes to common bacterial blight, and bean common mosaic and necrotic viruses	**Ms. Pamela Chogo** Blending traditional and modern knowledge in developing a natural language processing chatbot for knowledge sharing	
13:20- 13:30	**Mr. Peter Fred** Exploring current and future trends of predictive maintenance 4.0 in Tan-zania: A systematic literature review	**Mr. Adrian Mvile** Elucidating the Effect of Genotype x Envi- ronment Interaction and Storage Time of Selected Common Bean (*Phaseolus vulgaris*L.) Genotypes on Cooking time	**Ms. Isabella Luanda** Production of citric acid from banana peels using fungus aspergillus niger	
Sponsors				

13:30- 13:40	**Mr. Award Mushi** Willingness to Pay (WTP) for Attributes of the Mastercard Farmers Network (MFN) in Tanzania and Uganda	**Mr. Geofrey Sikazwe** Assessing the effect of sample storage timeon viral detection using a rapid and cost-effective CTAB-based extraction method	**Dr. Ramadhan Majubwa** Effect of harvesting stage on postharvest quality of black pepper (*Piper nigrum* l.) cultivars grown in Morogoro, Tanzania
13:40- 14:00	**Discussion**		
	Preparedness for Fourth Industrial Revolution	**Traditional knowledge - I**	**Traditional knowledge - II**
	Moderator Dr. Ally Simba **Rapporteurs** • Dr. Hulda Gedion • Mr. Method Rutechura •	**Moderator** Dr. Prosper Massawe **Rapporteurs** • Dr. Samson Kambona • Mr. Clavery Makoti •	**Moderator** • Dr. Wilbert Manyilizu **Rapporteurs** • Dr.Kulwa Kangeta • Dr. Rigobert Ngeleja
14:00- 14:10	**Dr. Cosmas Myanyi** The Fourth Industrial Revolution and Persons with Disabilities: The Case of Digital Inclusion at the Open University of Tanzania	**Mr. Stanslauss Lukiko** Quality of Propolis from Phytochoria of Tanzania Based on Antioxidant andAntibacterial Properties	**Dr. Zahra Majili** Development and Profiling of Affordableand Nutritionally Optimal Pigeon Pea- Based Products for Improved Recipes Diversification in Rural Communities in Tanzania
14:10- 14:20	**Ms. Win Luhwago** Determinants and Competitiveness of Rice Export in Tanzania: A Vector Error Correction Model	**Dr. Chelestino Balama** Social Network Analysis and Stakeholders Influence on Moringa Plant Development Potential in Mpwapwa District, Tanzania	**Ms. Amina Ahmed** Beyond Food Preparation: Potential of the Field of Food Science and Technology in Tanzania and Beyond
14:20- 14:30	**Dr. Emmanuel Mzunda** A SWOC analysis of industrialization in Tanzania: strengths, weaknesses, opportunities and challenges	**Mr. Allen Richard** Beekeepers perception on arrangements used in supporting beekeeping activities in Tanzania	**Ms. Sambwe Fundikira** Consumers knowledge and practices on pesticide residues reduction in tomatoesin Mvomero, Morogoro region, Tanzania
14:30- 14:40	**Mr. Nasibu Sadick** The role of public health laboratory towards responding on emerging disease outbreaks in Tanzania.	**Dr. Frank Rwegoshora** Isolation and elucidation of antibacterialcompounds from roots and stems of *Synadenium glaucescens* Pax	**Dr. Richard Madege** Pre-sowing treatment to improve seed germination and seedling growth of *Commiphora swynertonii* (Burrt.) and *Synadenium glaucescens* (Pax.)
14:40 -15:00	**Discussion**		
15:00- 17:00	**Posters Presentations**		
09:00- 17:00	**Exhibitions**		
17:00 -	**End of Day 1**		
18:30 - 21:00	**Gala Dinner for Invited Guests**		

8TH ANNUAL NATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CONFERENCE AND EXHIBITIONS

Master of Ceremony - Mr. Shaaban Kissu

PROGRAMME		
THEME: Science, Technology and Innovation for Sustainable Development		
15TH JUNE 2023: DAY TWO		
TIME	**SESSION**	**RESPONSIBLE**
07:30- 09:00	Participants arrival, Registration and Breakfast	**Secretariat**
09:00- 09:10	Recap of day one	**Dr. Bugwesa Katale** - Director for Research Coordination and Promotions - COSTECH
09:10- 10:10	**Plenary session III:** **Keynote presentation:** STI for green, resilient and inclusive economy	**Presenter** Dr. Zena Mpenda **Moderator** Prof. Razack Lokina - UDOM **Discussants** 1. Dr. Julius Ecuru - BIOINNOVATE AFRICA 2. Prof. Magreth Bushesha - OUT 3. Dr. Julius Keyyu - TAWIRI 4. Prof. Fortunata Makene - Uongozi Institute **Rapporteurs** • Ms.Neema Tindamanyire • Dr. Samson Kambona
10:10- 11:10	**Plenary session IV:** **Keynote presentation:** Innovation for Human Development	**Presenter:** Mr. Omar Bakari **Moderator** Dr. Flora Tibazarwa - UDSM **Discussants** 1. Mr. Jumanne Mtambalike - Sahara Venture 2. Mr Joseph Manirakiza - Funguo Tanzania Project 3. Dr. Erasto Mlyuka - COSTECH **Rapporteurs** • Dr. Prosper Massawe • Mr. Ntufye Mwakigonja
11:10-12:00	**Plenary session V:** **Keynote presentation:** Role of biotechnology towards 4IR	**Presenter:** Dr. Ali Mahandhi - UDSM **Moderator** Dr. Philbert Nyinondi - SUA **Discussants** 1. Dr. Stella Rwezaula - MUHAS 2. Dr. Daniel Maeda - UDSM 3. Dr. Deusideth Mbanzibwa - TARI 4. Dr. Brian D. Tarimo - IHI **Rapporteurs** • Dr. Beatrice Lyimo • Dr. Wilbert Manyilizu
12:00- 13:00	**LUNCH**	

TIME	SIDE EVENTS	HALL
09:10- 12:00	**Seminar on the contribution of STI for socio-economic development- COSTECH**	**SAADAN**
13:00- 14:30	**Forum on Agricultureand Food Security - COSTECH**	**SAADAN**
14:30- 17:00	**Applicationof Modern Biotechnologyin Health in Tanzania- Ifakara Health Institute (IHI)**	**SAADAN**
13:00- 16:00	**Innoversity Project - Sahara Ventures**	**UDZUNGWA**

TIME	RUAHA HALL	MIKUMI HALL	SAADAN HALL	UDZUNGWA HALL
	Technical Symposia (Presentation of Research Papers)		**Side Events**	
	Green, resilient and inclusive economy	**Innovation for human development**		
	Moderator Prof. Razack Lokina **Rapporteurs** • Dr. Kulwa Kangeta • Dr. Joseph Maziku	**Moderator** Dr. Flora Tibazarwa **Rapporteurs** • Mr. Ntufye Mwakigonja • Dr. Prosper Massawe		
13:00- 13:10	**Martin Komba** Economics of Rice Irrigation Technologies in Kilombero Sub-Basin: A Case of FarmingHouseholds from Kilombero District, Tanzania	**Ms. Amina Ahmed** Unlocking The Economic Potential of Hyphaene Species Known as Mikochein Tanzania		
13:10- 13:20	**Dr. Mohamed Said** The economic viability analysis on the Adopted Climate Change Adaptation Strategies among Maize small-holder Farmers inKongwa District, Tanzania	**Dr. Proscovia Kamugisha** Using Zero Energy Cool Chambers to Reduce Postharvest Losses in Fruits and Vegetables for Increasing Tanzanian Farmers Income		
13:20- 13:30	**Mr. Jumaa Athumani** Screening of Aflatoxin Producing Fungi Associated With Maize In Selected Areas OfMorogoro Municipality	**Prof. Gration Rwegasira** FAT Advisory Tool for improved diagnosis and decisions in selecting appropriate insecticides for management of FAW	**Forum on Agriculture and Food Security - COSTECH**	**Innoversity Project - Sahara Ventures**
13:30- 13:40	**Mr. Joseph A. Leonard** Effect of Tillage, Pre-Emergence and Post-Emergence Weed Control Options onWeeds, Cassava Growth and Yield at Kiimb-wanindi Village in Mkuranga, Tanzania	**Dr. Paschal Kija** Clinical benefit of MKANDA SALAMA KITin a real world population with PPH		
13:40-14:00	**Discussion**			
14:00-14:10	**Dr. George T. Mhamba** Limitations of Agroecological Practices and Stakeholders Response: A Case of Uluguru Mountains Landscape in Morogoro Municipality, Tanzania	**Prof. Bendantunguka Tiisekwa** Innovative approach to mitigate aflatoxin and micronutrient problems in complementary foods (CFs) for health and economic wellbeing		
14:10-14:20	**Dr. Richard Madege** Biofungicidal effects of *Commiphora swynnertonii* (Burrt.) and *Synadenium glaucescens* (Pax.) against Tomato Fusarium Wilt Disease	**Ms. Joan J. Mnyambo** SmartTB: An Integrated Digital Patient-Centric Tool for Promoting Adherence to Treatment among People Living with TB in Tanzania		

TIME	Green, resilient and inclusiveeconomy	Innovation for human development		
	Moderator Dr. Julius Keyyu **Session Rapporteurs** • Ms. Hilda Lyatuu • Ms.Erica Nkonoki	**Moderator** Mr. Jumanne Mtambalike **Session Rapporteurs** • Ms. Bestina Daniel • Dr.Samson Kambona	**Forum on Agriculture and Food Security - COSTECH**	**Innoversity Project - Sahara Ventures**
14:20-14:30	**Mr. Elick Stephano** Introducing Anti-mercury reagent and Movable sluicing as alternativeof Mercury in gold recovery to smallscale mining	**Ms. Maria Lashau** The Effectiveness of Dig Tech Platforms to The Development Of Tanzania Women Innovative Startups In Arusha Region		
14:30-14:40	**Dr. Thomas Sawe** Types, sizes and spatial distribution ofbeehives in Tanzania: implications for honey production	**Prof. Emmanuel Nzunda** Imitation and Innovation of Ideas, Inventions, Principles and Practices in Culture, Education, Science And Technology Lessons From Asia And Europe For Tanzania	**Application of Modern Biotechnology in Health in Tanzania - Ifakara Health Institute (IHI)**	
14:40-15:00	**Discussion**			
15:00-16:10	**Dr. Yasinta Nzogela** Suppression of Root - Knot Nematodes in Tomato (*Solanum lycopersicum*) and cucumber (*Cucumis sativus*)fields by using trichoderma and botanical pesticides	**Dr. Akinyi Sassi** Imitation and Innovation Strategies for improving Tanzania cross border e-commerceperformance: Lessons from China		**FREE VENUE FOR SIDE EVENT**
16:10-16:20	**Ms. Zainab Liumba** Improvement of quality and shelf life of cane juice for consumer safety andincome generation	**Ms. Mwajabu Suleiman** No More Death, No More Birth: A Novel Method for Rodent Management		
16:20-16:30	**Mr. Emmanuel Nkuwi** Occurrence of entomopathogenicfungi of *Spodoptera frugiperda* (lepidoptera: noctuidae) in selected areas of tanzania	**Mr. James Kalema** Use of Digital Technology to Access Continuing Professional Development: Case of Tanzania Health Workforce		
16:30-16:40	**Mr. Azaria Chongeri** Assessment of the change in the collagen content of the skin due to unhairing process	**Mr. Petro Mwamlima** Efficacy of place based innovated briquetting technologies for sustainable cooking and heating energy in Tanzania		
16:40-17:00	**Discussion**			
09:00 -17:00	**Posters Presentations and Exhibitions**			
17:00-	**End of Day 2**			

Master of Ceremony - Mr. Shaaban Kissu

PROGRAMME		
THEME: Science, Technology and Innovation for Sustainable Development		
16TH JUNE 2023: DAY THREE		
TIME	**SESSION**	**RESPONSIBLE**
07:30- 09:00	Participants arrival, Registration and Breakfast	**Secretariat**
09:00- 9:10	Recap of day two	**Dr. Gerald Kafuku** Director of the Centre for Development and Transfer of Technology - COSTECH
09:10- 10:00	**Plenary session VI:** **Keynote presentation:** Contribution of Traditional Knowledge in STI development in Tanzania	**Presenter:** Prof. Hamis Malebo - UNESCO National Commission **Moderator** Dr. Paul Kazyoba - NIMR **Discussants** 1. Dr. Mayassa Ally - ZAHRI 2. Dr. Nicholous Otieno - ITM, MUHAS 3. Dr. Richard Bigambo - UDSM **Rapporteurs** • Ms. Bestina Daniel • Dr. Joseph Maziku
10:00- 11:00	**Plenary session VII:** **Keynote presentation:** Open Science and policy interface	**Presenter:** Dr. Paul Samwel Muneja - UDSM **Moderator** Prof. Jumanne Daudi Kalwani **Discussants** 1. Prof. Wulystan Mtega - SUA 2. Dr. Athuman Semzugi - OUT 3. Dr. Respickius Casmir – CBE 4. Prof. George K. Gitau- EAJSTI **Rapporteurs** • Dr. Hulda Gideon • Mr. Method Rutechura

TIME	SIDE EVENTS	HALL
09:15- 12:00	The Nexus of climate change, Defence and Security (Closed Session) -COSTECH	UDZUNGWA
09:00- 12:00	Government of Tanzania and Development Partners working groupsession (Closed) - Government of Tanzania	SAADAN
09:00- 12:00	R&D Advisory Committees Meeting on Linkages between HL, RD institutions and Industry- COSTECH	RUAHA HALL
09:00- 12:00	R&D Advisory Committees Meeting on Community Engagement in Research - COSTECH	MIKUMI HALL

TIME	RUAHA HALL	MIKUMI HALL	SAADAN HALL	UDZUNGWA HALL
	Technical Symposia (Presentation of Research Papers)		**Side Events**	
	Traditional knowledge –III	**Open Science & Policy Interface**		
	Moderator Dr. Paul Kazyoba **Rapporteurs** • Dr. Rigobert Ngeleja • Mr. Clavery Makoti	**Moderator** Prof. Jumanne Kalwani- **Rapporteurs** • Dr. Deogracious Protas • Ms. Neema Tindamanyire		
11:00- 11:10	**Dr. Philipina Shayo** Underutilized Oyster nuts (*Telfairia pedata*): Farmers knowledge, practices andutilization in Northern Tanzania	**Dr. Grace Msofe** Measuring the Impact of Institutional Repositories in Selected Higher Learning institutions in Tanzania	**Government of Tanzania and Development Partners working group session (Closed) - Government of Tanzania**	**The Nexus of climate change, Defence and Security (Closed Session) - COSTECH**
11:10- 11:20	**Ms. Emanuela Massawe** Knowledge and Perceptionson Overweight and Obesity among Adults in Same District, Tanzania	**Dr. Aneth David** Knowledge and practices of open scienceamong scholars and researchers in Tanzania		
11:20- 11:30	**Mr. Dickson Manyama** In-Vitro Efficacy of Botanicals Extracts forthe Management of *Aspergillus flavus* Growth in Tanzania	**Dr. Noorali Jiwali** Space Science for Technological innovation in Tanzania		
11:30- 11:40	**Ms. Amina Ahmed** Fruit acidulants and storage conditions affect the physicochemical, microbiological and sensory characteristics of paneer	**Ms. Xuzel Villavicencio** Improving learning through classroom experiences in East Africa: Possible approaches for retrofits		
11:40- 12:00	**Discussion**			
12:00- 13:00	**LUNCH**			
	Plenary Session VIII: OPENING CEREMONY			
12:30- 13:30	Arrival of Guest of Honor and visiting exhibitions	DG -COSTECH		
13:30- 13:35	Remarks from Regional Commissioner- Dar es salaam	Hon. Albert Chalamila		
13:35- 13:45	Introduction to Invited Guests	Dr. Amos Nungu, Director General - COSTECH		
13:45- 14:00	A word from Tanzanite main sponsor	CRDB Bank		
14:00- 14:10	Entertainment	Mrisho Mpoto Band		
14:10- 14:20	Deliberations from STICE conference	STICE Chairperson		
14:20 - 14:30	A word from Permanent Secretary - MoEST	Prof. Carolyne Nombo		
14:30 -15:00	Speech from the Guest of Honor	Guest of Honor		
15:00 -15:20	• Issuing a dummy cheque to Innovators • The launching of a book : The Contribution of STI for Socio-economic Development • Awarding best paper and poster presenters	Guest of Honor		
15:20- 15:30	Closing Remarks	Prof. Makenya Maboko- Chairperson of the Commission		
15:30– 15:40	Group Photo	MC		
	Departure of Guest of Honor	Dr. Amos Nungu, Director General - COSTECH		
09:00- 13:00	**Posters Presentations and Exhibitions**			
15:40 -	**End of the STICE 2023 Event**			

Appendix II: Institutions Recorded to attend the 8th STICE event

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY

8TH ANNUAL NATIONAL SCIENCE, TECHNOLOGY AND INNOVATION CONFERENCE AND EXHIBITIONS

THEME: Science, Technology and Innovation for Sustainable Development

PROGRAMME

14TH - 16TH JUNE, 2023

Julius Nyerere International Convention Centre,

Dar es Salaam,Tanzania

Institutions Recorded to Attend the 8th STICE event			
21	St John's University of Tanzania	63	Embassy Of Nertherlands
22	Tanzania Agricultural Research Institute	64	European Union
23	Tanzania Broadcasting Corporation (TBC)	65	Information and Communication Technology (ICT) Commission
24	Tanzania Commission for Science and Technology	66	Office of the President of the Regional Administration and Local Government (PO RALG)
25	Tanzania Fisheries Research Institute	67	Tanzanian Meteorological Society (TMS)
26	Tanzania Forest Services Agency	68	United Nations Capital Development Fund (UNCDF)
27	Tanzania Forestry Research Institute	69	Tanzanian-German Programme (GIZ)
28	Tanzania Communications Regulatory Authority	70	Zanzibar Fisheries and Marine Resources Research Institute (ZAFIRI)
29	National Institute for Medical Research	71	Tanzania Insurance Regulatory Authority (TIRA)
30	World Bank	72	Tanzania Commission for Science and Technology
31	Japan International Cooperation Agency (JICA)	73	University of Dar es Salaam
32	World Food Program	74	MZINGA CORP.
33	Danish International Development Agency (DANIDA)	75	Minisrty of Education Science and Technology
34	Foreign, Commonwealth & Development Office (FCDO)	76	MAINL
35	Tanzania Livestock Research Institute	77	ND
36	Tanzania Regional Immigration Training Academy	78	MMJ
37	Tanzania Standard Newspaper	79	NMT
38	Tanzania Wildlife Research Institute	80	PSO
39	The Institute of Finance Management	81	TART
40	The Nelson Mandela African	82	ICDCA BMD

Institutions Recorded to Attend the 8th STICE event			
	Institution of Science and Technology	83	POFP
41	The Open University of Tanzania		
42	Tumaini University Makumira		

Appendix III: Exhibitors

SN	Exhibitor -Company Name	Exhibitors Name
1	LIQUID INTELLIGENT TECHNOLOGIES	Alice Mgonda
		Cecilia Nguma
2	Imperial Innovations Limited	Murtaza Ebrahim
		Robbert Asset
		Jumanne Fadhili
		Naqiyah Murtaza
3	CRDB Bank booth	Mr. Baraka
		Ms. Ninael
4	FUNGUO Innovation Programme - UNDP	Tunu Yongolo
		Irene Mnyitafu
		Daniel Mlabwa
		Mbwaike Mahyenga
		Alexa Haden
		Lin Chen
5	St.Jude Students-Grinding Machines	Boniphace Benjamin
		Robert Felix
6	UNCDF - Pesatech Accelerator	James Mwakajumba
		Meg Edwin
7	Sahara Ventures: Innoversity Project	Nice Msangi
		Felistas Makene
8	Directorate for Research Coordination and Promotion (DRCP-COSTECH)	Dr. Joseph Maziku
8	National Fund for Advancement of Science and Technology (NFAST-COSTECH)	Dr.Ntufye Mwakigonja
10	Directorate of Corporate Services (DCS -COSTECH)	Furaha Kabuje
11	Directorate of Knowledge Management (DKM-COSTECH)	Deusdedith Leonard

SN	Exhibitor -Company Name	Exhibitors Name
12	Centre for Development of Technology and Transfer (CDTF-(COSTECH)	Baby Mwakale
13	National Commission on Research, Science and Technology (NCRST)	Jacobine Taukondjele Amutenya, NCRST
		Name: Sara Ekondo, Company: Awana Foods
		Name: Una Ferreira, Company: Bold Creations
		Paulus Selma Nduukumwa, Company: Ilotu Cosmetics
		Anna Penohole Shiweda, Company: Noi Coding Kids
15	Ifakara Innovation Hub (IIH)	Amina Nyuri
		Abbas Hassan Rachel Magodi
16	College of Information and Communication Technologies (CoICT) - University of Dar es salaam	Diana Rwegasira
		Ally Botebo
		Karim M. Nyumba
		Faith Steven
17	DTBi Startup	Tanya Bhavesh Gorecha
18	DTBi Startup	Bihunia M. Kaoneka
19	DTBi Startup	Maria Mabugo
20	DTBi Startup	Joseph Paul Manda
21	DTBi Startup	Kelvin Paul
22	DTBi Startup	Karimu Mahmoud Khatwabi
23	DTBi Startup	Tiberius Mario Sarufu
24	DTBi Startup	Neema Bartholomeo
25	SmartDarasa	Kusiluka A. Justice
26	Saratani AI	Sangudi Sangudi
27	DTBi Startup	Anthony Elias

SN	Exhibitor -Company Name	Exhibitors Name
28	DTBi Startup	Wilbroad Edwin Nyirenda
29	DTBi Startup	Patrick Kitosi
30	DTBi Startup	Heriet Moro Batiki
31	iPhytos company Tanzania Ltd	Dr. Daniel Shadrack
32	TAFIRI	Ms. Siwema Luvanga
34	TakeCharge International Company Limited	Raphia Ally
		Emmanuel Malekela
35	Twende Technologies Ltd	Creda Fortius
36	Afri_Tech	Antony Elias
		Peter Mcharo
37	National Research Foundation, South Africa	Puleng Tshitlho
38	Tanzania Standard News (TSN)	Anitha Shayo

The Ministry of Education, Science and Technology through the World Bank financed Higher Education for Economic Transformation (HEET) Project partnered with the Tanzania Commission for Science and Technology (COSTECH) in organizing the eight-national science, technology, and innovation conference and exhibition (8th STICE) event that was held from June 14th to 16th, 2023, at the Julius Nyerere International Convention Centre, Dar es Salaam, Tanzania.

The Higher Education for Economic Transformation Project (HEET PROJECT) is an initiative aimed at fostering economic growth and development through the enhancement of higher education systems in Tanzania. The project is designed to address the challenges and opportunities related to higher education and its role in contributing to economic transformation.

HEET PROJECT involves collaboration between governments, educational institutions, and international organizations to identify and implement strategies that can lead to significant improvements in higher education. Among the goals of the HEET project includes:

1. Strengthening Curriculum and Research: HEET PROJECT focuses on enhancing the quality and relevance of higher education curricula and promoting research activities that align with the needs of the economy. This helps produce a workforce equipped with the skills and knowledge required for the modern job market.

2. Building Institutional Capacity: The project works to improve the capacity of higher education institutions by providing training and resources for faculty, administrators, and support staff. This strengthens the overall education system and allows institutions to better serve their students and communities.

3. Promoting Innovation and Entrepreneurship: HEET PROJECT often encourages an entrepreneurial mindset and fosters innovation within higher education institutions. By supporting incubators and startup programs, the project aims to create a conducive environment for generating new ideas and technology transfer to the economy.

4. Improving Access and Inclusivity: The initiative endeavors to make higher education more accessible to a broader population, including underserved and marginalized communities. Scholarships, financial aid, and outreach programs may be implemented to achieve this objective.

5. Developing Industry-Academia Partnerships: HEET PROJECT seeks to strengthen collaborations between higher education institutions and industries. This fosters a closer relationship between academia and the job market, leading to improved job placement opportunities for graduates.

6. Enhancing Governance and Management: The project may involve governance reforms and improved management practices within higher education institutions. Transparent and efficient governance can lead to better decision-making and resource allocation.

By addressing these key areas, the Higher Education for Economic Transformation Project aims to empower individuals with relevant skills and knowledge, fuel economic growth through innovation and entrepreneurship, and contribute to the overall development and transformation of the region or country's economy.

SEE YOU NEXT YEAR