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**THIRD ORDINARY SESSION FOR
THE SPECIALIZED TECHNICAL COMMITTEE ON
EDUCATION, SCIENCE AND TECHNOLOGY (STC-EST)
10th-12th DECEMBER 2019,
ADDIS ABABA, ETHIOPIA**

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**REPORT OF EXPERTS MEETING – PARALLEL SESSION ON
SCIENCE AND TECHNOLOGY**

INTRODUCTION

1. During the 3RD STC-EST meeting, the experts on Science and Technology had a parallel session on the 10th to 11th December 2019 to discuss the continental progress in STI, advocate for increased investment for Science and Technology, deliberate on reports presented by the division of Science and Technology of the Commission together with its regional offices in Malabo and Abuja, partner institutions, RECs and Member states on the implementation of STISA-2024 and its 5 years action plan with a view to deploy science, technology and innovation across various socio-economic sectors.

ATTENDANCE

2. The following attended the STI parallel session:

- a) Senior Officials of the following Member States: Algeria, Benin, The Gambia, Botswana, Burundi, Burkina Faso, Cape Verde, Central Africa Republic, Comoros, Democratic Republic of Congo, Djibouti, Egypt, Eswatini, Ghana, Kenya, Libya, Lesotho, Mali, Mauritius, Malawi, Morocco, Namibia, Nigeria, Uganda, Tanzania, Seychelles, Somalia, Sudan, South Sudan, South Africa, Togo, Zambia, Zimbabwe,
- b) Development Partners and International Institutions: UNESCO, UNECA, ICIPE, RUFORUM, UN-WFP, ATPS, AFCONE. PASET, SANSA, AAS and AfDB, ACBF, IAEA, AUDA-NEPAD, ACB, CAFOR

AGENDA ITEM 1: Opening of STI parallel session

3. The Chair of this Parallel Session is Dr James Kasigwa, Director, ST&I Regulation and biosafety, Ministry of Science, Technology and Innovation from Uganda as the newly elected chair of STC-EST to kick start the meeting, the chair requested for volunteer rapporteur from member states, Tanzania volunteered, The chair proceeded to inviting presenters to make their presentations followed by discussions from the floor.

AGENDA ITEM 2: Presentation on Science, Technology and Innovation (STI) for Africa Development

4. The Ag. Head of ST division presented an overview of the STI programmes within the division, specifically on the STISA-2024 implementation with its 5 years action plan, the African Kwame Nkrumah awards, the African union Research Grant, the AU-EU

HLPD on STI, Biodiversity, African Space Policy and Strategy and on the African Observatory for STI. He highlighted the need for a landscape analysis of STISA 2024 to see how STI is been implemented across national, regional and continental, noting that Science has to be included in all national, regional and continental agendas, as it is obvious that STI is a tool for development. The presenter highlighted the key findings of the STISA 2024 Five years implementation planning as low percentage of Africa's' GDP go to R&D as compared to other regions noting that some countries lack data and cannot be assessed; many African nations perform better than expected for innovation relative to their GDP per capita; business environment is strengthening especially for both large business and start-ups. The report also noted that there is Innovation gap between rich and poor countries on the continent which is growing. Furthermore, funding for STI and Higher Education is highly dependent on International sources. It was further explained that the 5 years plan also defined actions for the next 5 years. It was also noted that participation and relationship with RECs in implementation of programmes such as the Kwame Nkrumah Scientific regional awards, has not been consistent since inception. Under the AU-EU partnership for STI, he indicated that there is general consensus to focus on innovation for creation of markets. He also pointed out that Africa member states are not contributing in most of the programmes.

5. The Experts requests to the Ministers:

i) ON THE REPORT ON IMPLEMENTATION OF STISA-2024 (2014 – 2018) AND 5 YEARS ACTION PLAN

- a) **WELCOME** the Report and the 5 Year Action Plan to boost the implementation of STISA-2024 with a view to transform the continent into an innovation-led, knowledge-based economy;
- b) **URGE** Member States, Regional Economic Communities (RECs) and regional institutions to implement the Action Plan at all levels in the next 5 years
REQUESTS the Commission the Action Plan to all Member States and Partners;
- c) **REQUESTS** the Commission to assess the implementation of STISA 2024 to enable the preparation of the next iteration of 2034 STISA and report to STC-EST;
- d) **REAFFIRM** the role of the academies of science and reiterate the need for the national academies and collaboration with Network of African Science Academies (NASAC);

- e) **COMMEND** the strong collaboration between the Commission and UNESCO to improve science, technology and innovation on the continent, and **INVITE** other regional institutions to collaborate in this regard in order to promote coordination, synergies and maximize socio-economic impact of STI; and
- f) **RECOMMEND** that in line with the 5 year Action Plan, undertake an end of period review of STISA 2024 and enable preparation of the next iteration of STISA 2034.

ii) ON THE AFRICAN UNION KWAME NKRUMAH AWARDS FOR SCIENTIFIC EXCELLENCE

- a) **TAKE NOTE** of the launching of the programme annually from January and request Member States and RECs to widely disseminate information about the programme at national and regional levels to attract more applicants and raise the popularity of STI;
- b) **CALL UPON** Member States, the RECs and Partners to enhance synergies with similar awards programs at regional and continental levels in order to gain efficiency and sustainability;
- c) **URGE** Member States to collaborate with the Commission to financially support the AU Kwame Nkrumah Awards for Scientific Excellence programme;
- d) **FURTHER** urge the Commission to provide a platform to enable access and dissemination of this information across Africa from Member States and other Partners;
- e) **WELCOME** and appreciate the offer by the Republic of South Africa to financially support the prestigious Kwame Nkrumah Award for Scientific Excellence; and
- f) **ENCOURAGE** the Commission to launch the calls for the awards, scholarships, grants and any other bids in all AU languages to enable equitable access.

iii) ON AFRICAN UNION RESEARCH GRANT PROGRAMME

- a) **COMMEND** the African Union Research Grants Programme as a continental financial instrument to support and promote collaborative research in Africa; and capacity building for the Commission to create and manage a credible and competitive system of grants as a way to involve and support African scientists and researchers to collaborate on common research priorities of STISA-2024;

- b) **WELCOME** the technical and financial support by the EU for the Research Grant;
- c) **REQUEST** the Commission to combine the Africa Science Technology and Innovation Fund as stipulated in STISA 2024 with the African Education Fund into a single Education, Science, Technology and Innovation Fund and **REQUESTS** the Commission and the AfDB to undertake work towards the establishment and operationalization of this fund;
- d) **CALL UPON** the Commission to engage with ministers in charge of finance the private sector and other relevant financing institutions to identify funding options for research and innovation in Africa;
- e) **ENSURE** the creation of appropriate mechanisms that facilitate the translation of research and development outcomes into products, services and processes that stimulate socio-economic development;
- f) **FURTHER URGE** member states to promote intra-African collaboration and encourage the pooling of major scientific equipment and the creation of large regional thematic centres open to the African scientific community with African but also foreign co-financing; and
- g) **RECOGNIZE** the contribution of other regional associations and networks such as the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) to spur collaboration in a clear thematic area of agriculture.

iv) ON AU-EU HIGH LEVEL POLICY DIALOGUE ON SCIENCE, TECHNOLOGY AND INNOVATION

- a) **COMMEND** the AU-EU High-Level Policy Dialogue (HLPD) on Science, Technology and Innovation (STI) for the progress made in the implementation of agreed programme and **URGE** the Partnership to ensure sustenance of the current activities and to pay special attention to addressing the common socio-economic challenges, capacity building on research and infrastructures, human capital development, innovation and other cross-cutting issues;
- b) **FURTHER COMMEND** the progress in the implementation of the Research and Innovation (R&I) Partnerships on “Food and Nutrition Security and Sustainable Agriculture (FNSSA) and On Climate Change and Sustainable Energy (CCSE)”,

AND CALL UPON other relevant EU and African stakeholders to take part in the implementation of the R&I Partnerships;

- c) **WELCOME** the strong focus on Innovation through the recently established AU-EU Innovation Partnership as a critical framework to foster collaborative alliances and relationships between our continents to promote technology transfer and uptake; capacity-building, access to markets and removal of barriers that impede innovation and creativity as well as deepening dialogue and engagement between policy-makers and innovators;
- d) **URGES** the Commission to ensure that the African Member States have constant dialogues to formulate their common positions and priorities for future orientation of various cooperation on STI; and
- e) **URGE** the Commission to report on other partnerships such as Forum on China-Africa Cooperation (FOCAC), Tokyo International Conference of Africa's Development (TICAD) that are collaborating with the continent on Science Technology and innovation.

v) **BIODIVERSITY PROGRAM**

- a) **UNDERLINE** the potential of Africa's biodiversity for development and its conservation and sustainable use and **INVITE** Member States to enhance the value of biological goods and services including bio-based enterprises and scale up investments in sustainable utilization of biological resources for Africa's transformation;
- b) **TAKE INTO ACCOUNT** the emerging issues in particular Digital Sequence Information on genetic resources, and the need for global and national measures for access, fair and equitable benefits sharing such as appropriate technology transfer, capacity development, and monetary values at national and regional levels;
- c) **ENCOURAGE** the Commission in collaboration with its partners to continue its support in coordinating the African Group of Negotiators on Biodiversity to ensure that strong African common positions in the field of biosafety, biodiversity and access and benefit sharing of genetic resources are achieved;
- d) **NOTING** that in Africa, the UNESCO Man And the Biosphere programme is under the responsibility of most of the Ministry of Science and Technology **CALL UPON** Member States to use the current 79 Biosphere reserves in Africa as sites for research and training in STI to enhance environmental sustainability and to support the initiative of creation a fund for their sustainable financing; and

- e) **URGE** Member States to implement measures to tackle climate change and reduce its effects and impacts; to increase sustainable agricultural production and food security; and to promote wildlife conservation in Africa.

VI) AFRICAN SPACE POLICY AND STRATEGY

- a) **CALL UPON** the Commission, Member States, RECS and Partners to commit to implement the African Space Policy and Strategy in its entirety;
- b) **CONGRATULATE** the Arab Republic of Egypt upon the decision of the Assembly to host the African Space Agency and **INVITE** the Commission and Egypt to expedite the Hosting Agreement and process for establishing the Space Agency;
- c) **WELCOME** progress being made in the implementation of Global Monitoring of the Environment for Security (GMES) & Africa Initiative and **INVITE** Member States, national, regional institutes and the private sector to access the GMES & Africa products and services from the Regional Implementing Centers;
- d) **CALL UPON** AU Commission and European Commission to expedite the development, the finalization and the launch of the next phases of GMES & Africa initiative in order for the continent to benefit from the full potential of the programme; and
- e) **ACKNOWLEDGE** with appreciation the technical and the financial support by the European Commission and the partner institutions in the implementation of GMES & Africa Initiative and **INVITE** Member States and Regional Economic Communities to continue supporting its implementation.

AGENDA ITEM 3: PRESENTATION ON PROGRESS ON STRC PROGRAMME WITH SPECIAL FOCUS ON AFRICAN SCIENTIFIC RESEARCH AND INNOVATION COUNCIL (ASRIC)-

6. The presenter discussed the activities of STRC including a mid-term review of STISA 2024, launching and congresses of ASRIC, publication of monographs, capacity building of about 800 scientists, as well as establishment of AU Union of Scientists. The Chair of the bureau of ASRIC contributed to the presentation by highlighting flagship projects and the setting up of ASRIC Fund. Both presenters pointed out that STI is an enabler and tool for socio-economic development, hence STRC and ASRIC should be given the needed support and funding.

Ministers requested to;

- a) **REQUEST** the African Union Commission to allocate reasonable financial resources for ASRIC flagship projects as per Article 9 of its Statutes; and

- b) **CALLS UPON** international partners, Africa venture capitalists, and African financial institution to champion the mobilization of resources and to contribute to ASRIC.

AGENDA ITEM 4: PRESENTATION ON STATE OF SCIENCE TECHNOLOGY AND INNOVATION INDICATORS IN AFRICA - POLICY IMPLICATION AND RECOMMENDATION

7. The Ag. Director of AOSTI presented the progress report on the state of Science Technology and Innovation Indicators in Africa. After a brief introduction on the roots and steps that have led to the creation of AOSTI, he gave an overview of STI policymaking in AU member states. He raised the efforts made by countries in adopting explicit policies in STI and the coherence of these policies with their national development plans as well with regional and continental strategies. He then provided a global picture of R&D investment which shows that African countries are still below the continental target of at least 1% of the GDP spent on R&D. He stressed the lack of data in many countries compared to countries where there is an existence of dedicated institutions in charge of STI data collection and production. With regards to the production of knowledge, Dr Konte highlighted the low contribution of the AU despite the fast growth than that observed at the world level. He also emphasized the fact that collaboration between African countries in R&D is infrequent and occurs only in about 4% of scientific publications. He finished by presenting the Monitoring and Evaluation framework for the implementation of STISA, a work done with the support of UNESCO.

8. The Senior Officials request the Ministers to:
- a) **TAKE NOTE** of the report of the African Observatory for Science Technology and of the usefulness of STI data in facilitating policy and decision-making process;
 - b) **ACKNOWLEDGE** the efforts made by Member States in collecting, using and sharing statistical data;
 - c) **INVITE** Member States to consolidate the efforts gained in institutionalising STI data collection;

AGENDA ITEM 5: PRESENTATION AND DISCUSSION OF PROGRESS REPORT OF AUDA-NEPAD

9. The African Union Development Agency (AUDA-NEPAD) through its Directorate of Technical Cooperation and Programme Funding (DTCPF) presented the findings of the 3rd report

of the African Innovation Outlook (AIO-2019) and the progress on emerging technologies with the second set of three new reports in preparation.

10. Mr Lukovi Seke of AUDA - NEPA highlighted that during the 10-year period for which the ASTII Initiative has been in operation under the coordination of AUDA-NEPAD, 43 Member States have been trained in workshop sessions. Those sessions were mainly run by the programme in collaboration with AOSTI, RECs, UNESCO, UNU-MERIT, HSRC/CeSTII and the University of Lund. Without distinction of R&D or Innovation data submitted 33 AU member States submitted data between 2007 and 2017. The presenter noted that the problem with collecting and analysing R&D data in African Union member States is that aggregated data supplied by countries which are often not usually complete because the survey process does not cover all four sectors: Business, Government, Higher Education and Private Non-Profit institutions. An incomplete coverage of all sectors makes impossible the calculation of GERD intensity, the well-known 1% target, nor is it possible to calculate the number.

11. With regard to Emerging Technologies, Mr Lukovi Seke elaborated on the implementation and domestication of the first set of three reports (drones, gene drive and micro-grids) to be followed by the release of another set of three reports in 2020 mainly on artificial intelligence, next generation batteries and block chain.

12. The experts request the Ministers to:

a) TAKE NOTE of the end of the third phase of the African Science, Technology and Innovation Indicators (ASTII) jointly coordinated by AUDA-NEPAD and AUC through AOSTI; and the planned launching of the 3rd report of the African Innovation Outlook (AIO-2019) at a side event during the forthcoming Heads of State and Government Summit in 2020; and

b) TAKES Note of the progress of African Panel on Emerging Technologies (APET) which is currently analysing the second set of three technologies, namely artificial intelligence, next generation batteries and block chain.

AGENDA ITEM 6. MEMBER STATES UPDATE ON STISA IMPLEMENTATION AT COUNTRY LEVEL

13. Member States made presentation on their National STI programmes in connection to the implementation of STISA 2024. Summary of Reports are in annex 1.

14. The experts request the Ministers to:

a) REQUEST the Commission to expedite the development of a reporting template for Member States to track progress and harmonize reporting during the STC-EST meetings; and

- b) **CALLS UPON** Member States, RECs and relevant Partners to support the development and implementation of the STISA monitoring and evaluation framework .

AGENDA ITEM 7: UPDATES AND DISCUSSIONS ON IMPLEMENTATION OF STI INITIATIVES OF PARTNERS INSTITUTIONS

15. Various partners presented their STI initiatives and the summary of their report is in annex 2.

16. **The experts request the Ministers to:**

1. ON UNESCO OPEN SCIENCE

- a) **ACKNOWLEDGE** the game changing potential of open science in Africa for reducing the existing inequalities in STI and accelerating progress towards the implementation of the Agenda 2063 and the achievement of SDGs;
- b) **SUPPORT AND PROMOTE** open science initiatives at the national, regional and continental levels to increase access to scientific information, data, knowledge and networks and to bring science closer to society;
- c) **COMMEND** UNESCO for taking the lead in building a global consensus on open science; and
- d) **COMMIT** to support and actively contribute to the consultative and inclusive process led by UNESCO to develop a new international standard setting instrument on Open Science-the UNESCO Recommendation on Open Science to be adopted by the UNESCO General Conference in 2021.

2. ON SANSА SPACE WEATHER

- (a) **ACKNOWLEDGES** the importance of space weather, as espoused in the African Space Strategy, and we urge Member States to pay more attention to the impact of space weather on earth;
- (b) **NOTES** the Republic of South Africa’s recent designation by the International Civil Aviation Organization (ICAO) to provide space weather information to all flights within the African airspace, on 24/7 operational basis and welcome the Republic of South Africa’s successful bid for providing space weather information to the aviation sector, thereby ensuring the safety of lives over the African continent;
- (c) **WELCOME** the involvement of other African countries in the hosting of in-situ instrumentation to enhance our scientific research and development capabilities in this important field and thus enhancing the lives of our citizens; and

- (d) **CALL ON** Member States, the Commission and the Regional Economic Communities to cooperate with the Republic of South Africa on this global initiative.

AGENDA ITEM 8: ADOPTION OF PARALLEL SESSION REPORT

17. The senior officials considered and adopted the report of the STC3 -ST parallel session after formatting and incorporating relevant editorial inputs.

ANNEX 1: MEMBER STATES UPDATE ON STISA 2024 IMPLEMENTATION AT COUNTRY LEVEL

1. EGYPT

Egypt as a member of the C10 act as role model of investment in S&T. Egypt has increased the investment in S&T to be 1% GDP, and established new funding agency to promote and fund the R&D on national and regional levels to face our societal challenges. Egypt is advancing the research and innovation for technological issues, emerging technology and artificial intelligence; Egypt established national strategy for artificial intelligence and started the implementation of this strategy. Egypt established technological universities to fill the gap of technological jobs and support the strategy of 5th industrial revolution and emerging technology. This technological universities and AI strategy will achieve the continental strategy of TVET. Egypt is proposing developing AI strategy for Africa, and will talk about this issue in the AOB agenda item.

Egypt has strategized to bridge the R&I into industry and make industrialization of the R&D&I to ensure maximum outcomes from S&T and reflect on the socio-economic development. We can share this model and expand it on continental scale in support with the commission. Egypt hosted the African space agency and allocated 10M USD to kick off the agency and implement the continental space policy and strategy. Egypt has handed over the host agreement to the commission and once signed we will start the real implementation; for example Egypt allocated the plot of land that will be used to establish the premises of the African space agency once the host agreement signed.

Egypt signed the agreement of PRIMA for R&D&I with Europe partners and other northern African member states, this model is quite helpful to synergize the R&D&I on continental scale, however Egypt has this model on bi-lateral agreement with South Africa and launch regular calls for R&D between both countries, we propose to make this model on regional and continental scale to promote R&D&I to meet our continental challenges and achieve our continental S&T strategy.

2. BURUNDI

Based on the Continental Strategy on STI (STISA 2024), the Regional Policy on STI and its Strategic Plan from East Africa Science and Technology Commission (EASTECO), Burundi through the Ministry of Higher Education and Scientific Research has developed its National Policy for Scientific Research and Technological Innovation, the draft laws on STI, and had put in place the Academy of Sciences and the National Commission for Science, Technology and Innovation. The STI budget is still small but efforts have been

made to fund research projects through the creation of the doctoral school and 21 research centres in universities. Particular emphasis has been put on technical and vocational training in developing statistics and the use of ICTs at all levels of training. To boost industrialization, an Academia-Public-Private Partnership Forum is organized each year to promote the valorisation of research findings (results) and their transfer for technological innovations by firms and the creation of business enterprises (e.g. start-ups and others).

Burundi is also focusing on partnership, hunger eradication and disease control. RUFORUM is currently financing the establishment of an incubation centre at the University of Burundi. There is a Regional Bio-Innovate Project for the fight against malaria with Uganda, Tanzania and Kenya. There is also a project to create a Centre of Excellence in Nutrition with the support of AfDB and the Reference laboratory in Health Sciences. Burundi has also carried out its R&D surveys for the period 2018 to produce indicators with the support from UNESCO.

Finally, on emerging technologies, Burundi highlighted the valorisation of the national expertise and the main orientations focus on the large coverage of ICTs at the first stage before moving towards artificial intelligence. The challenges are still there such as low investment in research and innovation, low access to internet, low access to energy and low access to computers for students and researchers.

3. ZIMBWABWE

The portfolio of science and technology development in Zimbabwe is under the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development. The Ministry oversees institutions of higher and tertiary education as well as the R&D sector in the country. In Zimbabwe, our Current Environment is characterised by High Literacy levels which is above 94%. However, the skills levels as established in the National Skills Audit of 2018 is at 38%, with over 88% skills deficit in the STEM-related fields. There is also a disconnect between the needs of existing & future industries and the focus of higher and tertiary institutions. As part of the implementation of STISA 2024, Zimbabwe has started the reform process of its Science and Technology Sector through the transformation of its higher and tertiary education, science and technology sector. The reconfiguration is moving from Education 3.0 to Education 5.0. This redesigning of the system has seen the addition of Innovation and Industrialisation to the three traditional pillars of Teaching, Research, and Community Service/Consultancy.

In the pillar of Innovation Zimbabwe has completed four (4) Innovation Hubs at four universities, and two others which are at an advanced stage of construction will be completed in the new year. The Innovation Hubs are centred on anchor projects within

the national priority projects according to the government's strategic plan on innovation, science and technology development. Some of these programmes include Cattle Breeding technologies, Vehicle Tracking Technologies and the Traditional Cereals Processing Technology Programme amongst others. Under the pillar of Industrialisation, two (2) Industrial Parks are currently under construction and at least two more expected in the new year. The Industrial Parks will commercialise the outputs from the anchor projects coming from the innovation hubs. In line with Africa's Space policy, Zimbabwe has set up the Zimbabwe Geospatial and Space Agency (ZINGSA) which is currently involved in 7 key national projects. In order to build research capacity for participation in the 4th Industrial revolution, Zimbabwe is currently expanding the Zimbabwe Centre for High Performance Computing (ZCHPC) to add more computational and storage resources to the current national supercomputer.

Zimbabwe's transformation from Education 3.0 to 5.0 is anchored on a heritage-based philosophy, which entails having development anchored on the comparative advantage of Africa's God-given natural endowments i.e. its people and natural resources. Why heritage-based? – The colonial system was never designed for us, but to sustain the colonial administrative system with minimal technical skills to do basic repair and maintenance of primary resource extraction industries. The reconfiguration is meant to take us onto the path homegrown economic development. A key learning point has been a positive change in national funding attitudes due to the alignment of research efforts with tangible national priority needs.

4. BOTSWANA

Botswana has a Policy on Research Science Technology and Innovation (RSTI), developed in 2011. The Policy is undergoing review with the assistance of United Nations Conference on Trade and Development (UNCTAD). Botswana continues to provide funding in research, as at 2014, Gross Expenditure on R&D as a percentage of GDP was 0.5%. The Government of Botswana contributed about 80% of the GERD. In view of the country is currently developing a Strategy on Private Sector Engagement with support of the Science Granting Council Initiative.

The following highlights the country's commitment in implementing STISA;

1. Eradication of Hunger and achieving Food Security: Botswana has institutions in place which undertake research in food technology, animal, production, animal medicine, crop production and indigenous technologies. For instance, the National Food Technology Research Centre is currently developing a Nutri Drink from indigenous plants.

2. Prevention and Control of diseases: The University of Botswana Medical School and the Teaching hospital and other stakeholders provide research in HIV/AIDS and other non-communicable diseases and traditional medicines.
3. Protection of Space: Botswana is currently developing a National Space Science Strategy to harness the benefits derived from our clear skies. Botswana is also actively participating in the Square Kilometre Array Project in consortia with other countries. The country continues to invest heavily in Earth Observation technologies to monitor drought, floods and other natural disasters.
4. Wealth Creation: Botswana Innovation Hub (BIH) and the Local Enterprise Authority (LEA) provide incubation facilities to innovation start-ups and SMMEs in view of promoting entrepreneurship in STI. Furthermore, through the Innovation Fund, seed capital is provided to entrepreneurs to develop prototypes. There are Community Innovation Centres which provide a platform to community to express their innovative capabilities and come up with innovation products.
5. Human Resource Development: Botswana is developing a Labour Market Observatory (LMO) which seeks to give direction on development of human resource. There are also Sector committees to guide in identifying skills for the future in different key sectors of the economy. In addition to four (4) public universities, there are numerous privately owned universities as well as technical colleges. Botswana Qualification Authority (BQA) provide guidance accreditation of institutions and courses being taught in the institutions of learning. Under the SGCI, Botswana has partnered with SARIMA to provide national capacity building in Research management, Research Ethics, M&E, Research Grants Management and IP
6. RSTI Monitoring & Evaluation: Botswana continues to work with NEPAD through the ASTII Programme to collect and collate R&D and Innovation indicators to monitor investment in STI.
7. Science Engagement: The government is currently developing a Strategy on Science Communication and Public Engagement in view of demonstrating value and impact of investment in RSTI. Some of the activities undertaken to promote STI in Botswana are: Annual National Science Week, Annual STEM Festival, Quarterly research seminars and Annual research dialogue conferences where topical STI issues are deliberated.
8. Infrastructure: Botswana owns state-of-the-art Materials Science Lab which undertake research on nanotechnology, material sciences, natural sciences and ICT. Furthermore, the country has a Medical school and Teaching Hospital. NFTRC has been regionally recognized as the research Designated Institution (RDI) in Food technology.
9. Partnerships: Botswana has several MOUs with other countries in the continent and beyond: South Africa, Zimbabwe, Mozambique, Kenya, China and India. Botswana

is also participating in bilateral research programmes and initiatives such as SKA, SASSCAL, SAN-Bio and SGCI

10. Fourth Industrial Revolution: In an effort to leverage on the technologies and benefits to emanate from the 4IR, Botswana has started to embark on a national engagement crusade in view of raising awareness and coming up with country position to harness 4IR. In 2019, a national conference on 4IR was organized targeting three (3) key sectors of Education, Agriculture and Finance. The outcome of the Conference was a Country Navigator which gives strategic guidance for sectorial engagement and positioning to leverage on 4IR technologies for societal economic development.

5. SOUTH SUDAN

South Sudan before and after its independence in July, 2011, has recognized the crucial role of STI in achieving economic growth, prosperity and national social well-being. To achieve this objective, it started by putting some STI structure in place. A research ethics committee was established in 2006. In 2007 Sudan Research Council was created tasked among others to formulate a comprehensive policy and design programmes for STI and their implementation and to promote innovation, creativity and originality of thought and protection of intellectual property rights. In addition, it was also tasked to lay down appropriate criteria for assisting the private sector to employ scientific research and to promote production efficiency.

In 2016 the Ministry of education, science and technology was divided into two: Ministry of Education and Instruction (MoE&I) and Ministry of Education, Science and technology (MoHES&T). The latter was tasked with STI development of policy agenda & creation of its systems in the country. South Sudan Research Council was placed under MoHES&T.

The country has established STI research centres in Agriculture, Health sector and in area of animal resources and fisheries but still very weak in area of industry. However, most of these centres have come to stand still when the war broke out in 2013. In term of human resources development, the country has five public universities & five private universities and colleges and a number of technical and vocational education training centres.

The country recently to expedite STI development, commissioned a study in collaboration with UNISCO which made some important recommendations salient among them is that STI governance should be overseen at the highest level of government, chaired by the President or designate of the President. In addition, Science, technology and innovation should be made a major component of a key development aspiration. In conclusion, the government of South Sudan firmly believe that harnessing appropriate STI systems and

practices is one way of achieving economic prosperity and to address myriad of developmental challenges facing the country.

6. TOGO

Togo has given importance to STI by initiating several programmes. Togo has legal and institutional frameworks that can give legal backing to STI. There is a national office of STI under the commission of higher education and research. Currently there is a national policy on research that will be validated in due time. Togo also has a draft STI policy. Within universities, there is the office of STI, which organizes research assignments within the universities. There are 55 research institutions promoting research across the nation. Togo ensures balance between students and job market by bringing on board entrepreneurs and industries. Togo has 3 centers of excellence funded by the World Bank and currently putting in place incubator centers that ensure graduate skills that are useful for the market, the incubator centers also ensure the right environment for young graduates with business acumen to develop. Togo is also putting in place national development programmes that can provide 500 jobs.

7. SUDAN

The council of ministers of Sudan in Oct. 2016 approved STI policies which translated into strategies and plans of action with clear priorities. The Ministry of Higher Education has been mandated by the government of Sudan to lead the future sustainable development of the country.

Recently the Ministry of Higher Education and Scientific Research has been working to update the STI Policies which are Scientific Research, Innovation and Transfer of Technology, Quality in Higher Education and Scientific Research, Governance and Administration of Higher Education & Scientific Research Institutions, as well as the provision of Equality and Equity in Higher Education. The country's research priorities include Education, Health and veterinary, Food security, Renewable energy, Mining, Water and sanitation, and Industry. Sudan also has a number of emerging technologies for mosquito control and fertilizer production.

8. NIGERIA

Nigeria with its large population is working through the ministry of Science and Technology to diversify the economy towards employment opportunities for youths. In doing this, the Ministry is currently reviewing its year 2012 policy, hoping that the revised policy will be launched in the 1st quarter of 2020. Other policies aimed at deploying STI to

drive the economy include: National Science and Technology R&D map; National leather and leather technology policy; National strategy for competitiveness in Raw materials development; National Methanol policy; Presidential executive order No 5. The federal Ministry of Science and Technology will be organizing its next EXPO from 16th to 20th March 2020 and invites the AUC and member states to participate in this EXPO. The Federal Ministry of SCIENCE and Technology supervises 17 Research and Development Institutions covering Space Science; Biotechnology; Natural Medicine; Engineering Infrastructure; Industrial Technology; Raw Materials; Technology Management; leather Science and Technology; Chemical Technology; Building and Road Research, among others. The Ministry maintains strong collaborations with the Universities and Private Sector Organisations, all aimed at ensuring that STI drives the economy"

9. LESOTHO

The current policy landscape is such that there is no innovation policy in Lesotho but the next policy steps are envisaged to incorporate innovation component in subsequent policy frameworks. Science and Technology bill is in the final stages of adoption and most importantly, it encompasses the establishment of the National Science and Technology Commission and the Innovation Trust Fund.

Current initiatives include efforts to establish the science academy. WISETO charter has been adopted and a national chapter has been established. The Innovation Hub has been established in the National University of Lesotho (NUL) and the design of Innovation park has been finalized and awaiting funds mobilization for construction. In terms of international cooperation, a bilateral cooperation roadmap between department of Science & Technology in Lesotho and the Department of Science and Innovation in South Africa has been established. The National Strategic Development Plan II has reinforced government's commitment to advancing the STI agenda by including Technology and Innovation as one of the four key priority sectors in the next four years. In conclusion, awareness of STI initiatives in the country culminates in the Science Technology and Innovation Week that is celebrated annually with a different theme every year.

10. The GAMBIA

The Gambia has taken the implementation of STISA 2024 very seriously. Since the inception of STIS A 2024, The Gambia has insisted on integrating and adapting the key Strategies and objectives of STISA and the ECOWAS Policy on Science and Technology.

Thus the National STI Policy of The Gambia describes a ten year Agenda2015-2024 to transform The Gambia into a knowledge-base innovation-led economy. In this regard, the country has made significant progress vis-a-vis creating an enabling environment where innovation can thrive by promulgating new STI promotion laws and promoting gender equality science education, science careers and occupations. These are part of efforts at implementing the recommendations of GO-SPIN and SAGA Projects jointly supported by the AU Observatory of STI (AOSTI) and UNESCO.

Currently, efforts are mainly focused on transformation in the higher education sector. The university of The Gambia Faraba Banta Campus Project worth over US\$100M is progressing smoothly. The transformation of The Gambia Technical Training Institute into a University of Science, Engineering and Technology (USET) is at very advanced stages. The USET will be mentored by KNUST of Ghana and De Mont Fort University, Leicester UK. This initiative is expected to build the critical mass of scientist, technologists and engineers to accelerate the country's development agenda. The country is also actively pursuing a digital transformation agenda. In the next few years most of government services would be digitized. A PPP arrangement has recently been finalized. A contractual arrangement has now been finalized with one of the major private tech firms in The Gambia to host the national tech hub. This hub will build capacity and promote technology entrepreneurship among women and youth. At the Basic and secondary levels, efforts are being focused on improving STEM curriculum with a focus on integrating robotics, artificial intelligence and automation. Students at this level have participated and excelled in a number of international competitions including but not limited to the FIRST Global and the PAN African Robotics Competitions. Over the last decade, the country observes the Annual National Science Week and over the last few years we have witnessed increase private sector participation Including the Next Einstein forum. The Gambia is also progressively working on establishing a National Innovation fund to fund research and a catalyst for entrepreneurial experimentation. In a similar move, The Gambia is actively pursuing the institutionalization of the collection, analysis and management of STI data and Indicators. There is need for support to strengthen capacities and capabilities on data analytics and Management. At the policy level, a mix of capabilities is required, including technical staff with specialized skills in data curation and stewardship, to manage the use of necessary standards and metadata. Policy and decision makers would find it useful to possess statistical skills, knowledge of key concepts and ability to effectively deploy statistical software.

11. ALGERIA

Science, Technology and Education in Algeria faces a dual challenge, moving from a natural resource and fossil fuel-based economy to a knowledge-based creative economy supported by highly skilled human resources, territorial equity, and sustainable development. The strengths of this strategy are based on training and research infrastructures made up of 106 teaching and higher education institutions, 25 research centres and 1400 research laboratories. Some 2 000 000 students, 65 000 post graduates, 70,000 teachers and 30 000 researchers make functional these spaces to promote the development and transmission of knowledge, knowledge and technology.

The scientific and technological priorities to support the new Algerian economic policy are essentially focused on the optimization of human and financial resources, the efficient operation of training and research infrastructures, the creation of strategies, SMEs/SMIs and the competitiveness of companies. These combined and shared resources are able to respond to the major challenges of sustainable development based on the following instruments:

- common services bringing together technological platforms and world-class scientific equipment available for the benefit of the community;
- a strategy for mobilizing human resources by encouraging national and international collaborations between laboratories and research centres;
- training programs on sharing tools, and the establishment of a culture of innovation in higher education;
- identification of a limited number of coherent scientific and technological priorities to support the NPE;
- Multidisciplinary to allow the most innovative approaches and the most adapted to the challenges of our society;
- human and social sciences to support researchers on issues related to priority areas;
- the establishment of an adequate ecosystem including innovative companies, project leaders, universities, technological development poles

Thus, six national priorities for scientific and technological research covering both basic and applied research are identified in the government program as well as at institutional meetings organized by/with various ministries.

12. UGANDA

Uganda has given a lot of priority to STI to the extent of creating a dedicated Ministry for Science, Technology and Innovation in 2016, headed by a cabinet Minister. The ministry

is putting in place STI policies and trying to effect national STI ecosystems that brings together all relevant stakeholders from Industry, Academia and Government, building relevant skills for industries. The government has put in place Research and Innovation Fund programme, to support innovators and recently established the National Space Programme. Uganda is also working on 4IR strategy that embraces emerging technologies, working on Biotechnology & biosafety regulatory framework. Uganda has initiated STEM programmes at lower educational levels and TVET have been established to ensure the requisite skills for industrialization and entrepreneurship. Uganda has also has The Vision 2040, a programme that is aimed at taking Uganda from a third world to a medium income country. The Theme for the National Development Plan III is sustainable industrialization for jobs and wealth creations, and STI is critical to delivery of the plan, and within which a number of projects are sponsored. On partnership, Uganda has signed MoUs with a number of Countries and other partnerships with Egypt, Nigeria, Kenya, and Sudan on Space issues.

With Uganda as chair of STC-EST3, it is hoped that more will be achieved in the area of STI.

13. TANZANIA

The United Republic of Tanzania (URT) considers Science Technology and Innovation (STI) as key enabler for socioeconomic development. The URT has implemented STISA 2024 by achieving the following milestones: initiated review of the S&T to STI policy and national research priorities to align with the national development priorities; establishment of the National Fund for Advancement of Science and Technology to support research and innovation initiatives; funded upgrading of research infrastructure in Higher learning and research institutions; ensured that sufficient human capital is prepared with requisite skills to cope with technological transformations; increased access to quality and inclusive education that has significantly increased as result of the free basic education policy where by about 24.0 billion Tanzanian Shilling is spent monthly.

To ensure technical capability for the fourth industrial revolution (4IR), a total of 43 new Vocation Education Training Colleges and one new Technical Education College are under construction during the financial year 2019/2020. In building capabilities on emerging digital technologies and internet connectivity, National ICT Broadband Backbone has been established and all regions and districts are endowed with of point access for last-mile connectivity. Furthermore, centres of excellence for research and innovation in emerging technologies have been established including: Two specialized in ICT centres of excellence (with super-computing facilities) at Dar es Salaam Institute of Technology and Nelson Mandela African Institution of Science and Technology (NM-

AIST); SACIDS -African centre of excellence in Infectious Diseases of Humans and Animals with a BSL3 laboratory facility at Sokoine University of Agriculture (SUA); African Centre for Health of Aquatic Resources (SUA); Centre of Cardiovascular Diseases; the Africa Centre for Research, Agricultural Advancement, Teaching Excellence and Sustainability (**CREATES**); Water Infrastructure and Sustainable Energy Futures (WISE – Futures) African centre of excellence; Leather Technologies (DIT). Furthermore, the government has established the National guidelines for identification, recognition and support of grassroot innovators and the also the annual national STI competitions to promote innovation among youth. The Commission of Science is currently supporting and coordinating more than 45 innovations hubs for nurturing innovative ideas and innovations into startups and companies.

14. COMORROS

Comoros is working towards establishing an STI policy and calling on the support of the AUC, UNESCO and Morocco to support this venture. Comoros hopes that experiences, mistakes of other African countries will aid the development of this policy and hopes that by 2030, Comoros will have a good STI policy that will be one of the best in Africa.

15. SEYCHELLES

The journey of Seychelles to the implementation of STISA-24 started in April 2014 with the enactment of the National Institute for Science Technology and Innovation, NISTI. The same year, a High Level Steering Committee for Knowledge-based economy (KBE) was established to provide guidance for Seychelles transition to KBE by 2025. This committee is chaired by the Vice-President of the Republic.

To this effect, NISTI has launched a policy and strategic framework: STI Policy and Strategy 2016 -2025. This is an integrated STI Governance system to achieve the national STI agenda through the integration of STI across all sectors and programs. The framework has set clear milestones to get through this transition. The Government has recognized the role of STI as a pillar of development in the National Development Plans (NDPs) as well as the key tool to achieving sustainable development goals (SDGs). STI is highly featured in **Seychelles Vision 2033**. The framework sets out to address three gaps: (i) the development of National Research Foundation (NRF) to strengthen R&D, (ii) a central repository with access to all for all scientific data and (iii) the establishment of a Business Technology and Innovation (BTI) incubator for the uptake of research to commercialization. The policy also puts emphasis on Tech Transfer and STEM education, especially on the sensitization of the frontier technologies such as robotics, blockchain,

AI, UAV, Renewable Energy, Space 2.0 and others that are relevant to the particularity of Seychelles as a SIDS with demographic challenges, small land mass but with huge EEZ as a large oceanic state and a high-income country. Application in robotics, blockchain, AI are in progress. Regarding Renewable Energy, Seychelles has target to be 100% on Renewable Energy by 2050 with an energy mix of wind, solar, oceanic sources and other substitution to hydro-carbon. Seychelles is the first on the continent to building floating solar farm. The project is in advanced stage. There is a strategy being worked out for making electric vehicles as a main source of transport.

This is very important as we developed in an environment that is in flux. Being small, insular and challenged demographically, partnerships are crucial and we have developed a number of institutions to institution partnerships as well as bilateral and multilateral partnerships to support the national STI agenda. Regarding the 4IR, Seychelles is cognizant of challenges that comes with 4IR and is looking at the five pillars of 4IR, namely; Basic infrastructure, Digital Infrastructure, Enabling Environment, Enabling Technologies, Enabling technologies and Human Capital Development. In this context boast for the best in basic infrastructure in Africa and now deploying 5G network in 2020 and looking at the stack of enabling technologies that will keep the nation to remain a leadership in the Blue Economy. In terms of funding, PPPs, innovative financing mechanism and other innovative ways to fund our STI agenda are being promoted due to being challenged in attracting funding as a high-income country. As a champion in environmental conservation on a global level all our STI agenda takes into account the fine line between development and environment sustainability. This is will always be central on how we implement STISA-24.

16. GHANA

Under the period of Review, Ghana has been implementing a number of programmes aimed at implementing STISA

- ***Establishment of Presidential Advisory Council on Science Technology and Innovation (PACSTI):***
A 9-member Presidential Advisory Council on Science, Technology & Innovation (PACSTI) has been inaugurated by H.E. the President in February 2019 to provide STI advice to the Executive arm of Government.
- ***Space Science:*** Ghana has drafted a space science policy. The policy outlines guidelines for Ghana to be a responsible space application user and contribute significantly to the space world. Following the successful establishment of the Ghana Radio Astronomy Observatory in 2017 which is part of the SKA and AVN project, the second phase has commenced with the building of Environmental

Monitoring Systems. A Ground Receiving Station is being established with support from SANSa under the Co-location project aimed at complimenting the operations of the Radio Astronomy Observatory in a cost effective and sustainable manner.

- **Establishment of Strategic Technology Center:** These centres will be providing technology development and innovation services to researcher, innovators and industry in the country.
- **Establishment of a Foundry and a Machine Tooling Centre:** Feasibility Studies for the establishment of Foundries and Machine Tooling Centres to improve capacity for the production of machine parts and tools for industries in Ghana and beyond has been conducted.
- **HPC Centre:** Ghana is establishing a High-Performance Computing (HPC) Centre to provide opportunity for both academic and private institutions to analyse model and simulate big data to help address both research and industrial challenges in areas such as health, environment, security, agriculture and natural resource management.
- **Preparation of the Science Agenda for Agriculture in Africa (S3A):** With support of FARA, Ghana has signed a commitment letter with AU to prepare the science agenda for Agriculture in Ghana. A roadmap has been developed and currently an investment proposal is being prepared.
- **Preparation of the STI Roadmap for the SDGs:** Ghana has been selected by UNESCO to participate in the Global Pilot programme of preparing the STI Roadmap for the SDGs. The roadmap will focus on how STI policy will lead in the implementation National Development Plans and AU Agenda 2063 leading to the implementation of the SDGs.
- **Establishment of a National Research Fund:** Ghana is establishing a National Research Fund and Government is ready to commit 1% of GDP into this fund annually. Ghana's participation in the Science Granting Council Initiative of Africa is key to the successful establishment and operation of the NRF.

17. MOROCCO

Morocco presented its R&D and innovation system, including the main components of the national system of higher education and R&D, the potential for training and R&D, some statistics, the status of the activities, and strategic and action plans. Morocco has 24 universities, 35 non-university higher education institutions and 19 public research institutions. The 2018-2019 scientific research statistics revealed 3203 research staff in public institutions, 21492 research professors and 36481 doctoral students.

The activities focused on improving the governance of the national R&D and innovation system. Funding for these activities has been provided by funds at the national level and through international cooperation. The reinforcement of the infrastructures concerned among others the establishment of an integrated information system for R&D and innovation, the establishment of the cities of innovation, the support to the setting up of the incubators of the universities and the creation of innovative companies.

In terms of cooperation, Morocco is involved in bilateral and multilateral cooperation at the African level and outside Africa.

The strategic frameworks for the application of STI include Vision 2015-2020, Action Plan 2017-2021, Framework Act No. 51-17 on Education, training and scientific research.

In conclusion, Morocco places STI at the heart of its development. Significant progress has been made in improving governance, increasing funding significantly, improving infrastructure and the valorization of the results of research and innovation, and strengthening North-South and South-South cooperation.

18. LIBYA

Libya supports funding of scientific research projects, 3 rounds per year targeting

- Health and biosciences
- Space science
- Energy
- Sustainable development

Thus far the total value of the funds is 50 million Li.D . There are several initiatives and competitions with the goals to explore inventors and innovators of all ages and educational levels.

- Best graduation project
- Competition of outputs (according to international standards) of scientific research and higher education institutions
- Supporting publishing initiative
- Support patents initiative
- Science and community initiatives

One of our priorities is to develop vocational skills for the Libyan youth to integrate them in the word of work. Libya research centres and universities with the research centres and universities with the researchers build confidence between and the leading centres and international universities.

- To associate Libya with innovation accomplishment and quality

- To raise the capabilities of those working on scientific research by committedly investing in human resources
- Developing ideal Libyan research centres which be a hotspot destination for international research and researchers to help create and innovative environment
- Advance the Libyan circle of innovations to gain the ability and converting research information applicable knowledge, economical return.

19. CENTRAL AFRICA REPUBLIC

CAR has embraced scientific excellence to satisfy the needs of its people. The country has a high education rate, with high drop-out rates. There is only one public university, with other private universities. The government emphasizes human capital development and has promoted a national colloquium for portable water for all countries in the Congo Basin. There is a water laboratory, in addition to other facilities for food safety and security.

20. SOUTH AFRICA

The new White Paper on Science, Technology and Innovation makes reference to adopting a systematic approach to expand the internationalization of STI and science diplomacy with a strong focus on the continent and with the aim of supporting a pan-African agenda.

Support to PAU Council

The DSI has contributed to STISA Implementation by building the technical competencies required for the governance and management of the PAU

The AU-NEPAD STI Flagship Programmes

The DSI and South Africa's National Research Foundation (NRF) has hosted four NEPAD Science, Technology and Innovation (STI) Flagship Pogrammes. South Africa's support towards the Flagship Programmes spans a period of just over 15 years. This has included significant strategic and financial investment amounting to an estimated R70 000 000.00 to expand regional and continental capacities in biodiversity, biotechnology, indigenous knowledge, energy, water, desertification, material sciences, photonics, laser technology and mathematical sciences.

Africa-EU Research and Innovation Partnership

South Africa has also had the opportunity to participate in the Africa-EU Partnership on Research and Innovation. More specifically the DSI have served on the bureau of the Africa-EU High Level Policy Dialogue on STI. Together with the African Union Commission, and our partners in the continent, we have influenced the STI priorities and

STI agenda of the AU-EU Partnership resulting in the adoption of Research and Innovation (R&I) Partnership on Food and Nutrition Security and Sustainable Agriculture as well as an R&I Partnership on Climate Change and Renewable Energy. The DSI has benefitted from this partnership with a significant financial contribution leveraged from participating in the various R&I projects and initiatives of the partnership. The DSI calls on its partners in the continent to consider the value that they could derive from participation in the Africa-EU R&I Partnership

9TH AU Private Sector Forum

This event is one of the key activities within the AU’s annual calendar - a strong indication of the political will within the continent to promote dialogue and offer pragmatic solutions in drawing on the efforts of public and private sector actors in achieving Agenda 2063. Hosted under the theme “Accelerating Africa’s Industrialisation through Digitalisation and Youth Technopreneurship, the DSI supported 10 tech entrepreneurs offering solutions in digital health, smart and sustainable energy, digital healthcare and digital agriculture. The Private Sector Forum was also used as a platform to engage African experts on the **African Inclusive Markets Excellence Centre** and the **Pan African Investment Code** – initiatives which will play a crucial role in the continent’s economic integration.

On Tambo African Research Chairs Initiative: Transforming the African Research Landscape

The NRF and the DSI in partnership with the Oliver and Adelaide Tambo Foundation and the International Development Research Centre of Canada have launched the OR Tambo Africa Research Chairs Initiative – modeled against the South African Research Chairs Initiative. This is a strategic programme which is aimed at strengthening research and innovation capacities in public research-intensive universities in Africa. It will attract and retain excellent researchers and scientists within Africa’s higher education system while also contributing to Africa’s global research competitiveness.

Innovation Portal

The DSI is also working with UNECA on an innovation portal and would like to work together with the African Union and our partners in the continent in rolling out this platform in the continent

South Africa’s Chairmanship of the AU in 2020

The DSI will occupy the chairmanship of the AU from January 2020 and would like to work closely with the AUC in supporting the AU through legacy initiatives that will respond to the objectives of STISA 2024.

21. BENIN

In Benin, the promulgated and modified law organizes the sector of education in three levels, namely, (i) Primary and Kindergarten, (ii) secondary education, technical and vocational training; and (iii) Higher Education and Scientific Research. The Ministry of Higher Education and Scientific Research is responsible for the design, implementation, monitoring and evaluation of the State's general policy on higher education, scientific research and innovation in accordance with international conventions, laws and regulations in force in the Republic of Benin. The National Science Research Policy is developed by the Ministry which has a National Directorate for Scientific Research and Innovation, an Agency for the valorisation or commercialisation of research results and Technological Innovation, and a National Fund for Scientific Research and technological innovation. Research activities are conducted through universities (University of Abomey-Calavi, University of Parakou, National University of Agriculture and National University of Sciences, Technologies, Engineering and Mathematics) and the Benin Center for Scientific Research and Research. Benin propose the introduction of mechanisms for continental collaboration to strengthen the capacity of academic staff and increase the number of women scientists in universities.

22. DRC

DRC has a new vision since the inception of a new government. The country believes STI is the foundation of all development, and has a day dedicated to innovation. The government believes that it is only through STI that its vast wealth can be utilized to uplift the living standards of population. There is an ongoing campaign to promote STI and the President is championing the promotion of STI as the new vision of DRC. Through his initiative, the government is attracting investors and adding value to available national incentives. New researchers are also coming in to the country who will be attached to Congolese scientists to work on specific areas. The government STI initiative is also targeting tourism which can be catalyzed through science and technology. There is a national scientific policy that has been developed and awaiting adoption.

23. ESWATINI

To date, the Government has embarked on the development and review of STI policies and strategies in an effort to create a conducive environment for R&D and Innovation for Eswatini, namely:

- Ratification of the 2008 SADC Protocol on STI in 2016 and has adopted several regional and international STI strategies in line with the implementation of STI programmes.
- All the organizational arrangements associated with the full operationalization of the Royal Science and Technology Park which was established in 2012. The RSTP which has 2 divisions, namely the IT Park and the Biotechnology Park, will serve as a catalyst for innovation. The IT Park is the hub of IT driven services and products (National Contact Centre, Business Incubation Hub, Advanced School of IT and the National Data Centre). The Biotechnology Park is a multi – purpose platform in bio – related technologies, production, marketing and trading (Biotechnology research centre, incubation facilities, service centre and agricultural related biotechnology)
- The review of the National STI policy of 2012 whose reviewed draft has already been validated and ready for submission to Attorney General’s office.
- The Bio-economy strategy and its implementation plan has been approved by the Cabinet. The Bio-economy strategy’s main objective is to form collaborative, concerted efforts between key institutions of the NSI, to maximise resources; the strategy encourages the sustainable use of natural resources and the preservation of the environment.
- The recently validated draft of the amended RSTP Act of 2012 seek to reposition RSTP as an innovation agency for the furtherance of research of science and technology related fields, innovation, associated technology transfer and foreign direct investment, and designated special economic zones.
- The National Council for RSTI Bill which seek resuscitate the NCRSTI to enable the provision for the co-ordination and funding of research, science, technology and innovation in the Kingdom of Eswatini has been approved by AG’s office and ready for forwarding to Cabinet.
- The R&D and Innovation surveys and the related Regional and international STI policies and frameworks. The launch and operationalization of the Kingdom of Eswatini Academy of Sciences (KEAS) which aims to recognize, support and promote excellence in scientific research performed by scientists who are in Eswatini to promote contacts and collaborations among scientists, amongst emaSwati scientists and between them and the global scientific community; and to strengthen the global position and role of scientific research performed by Swati scientists;

- The Ministry of ICT has also embarked on the signing of MOUs on STI with other countries such as Mozambique, Kenya, Republic of South Africa that have compatible innovation ecosystem to foster the exchange of scientists, researchers, software developers and best practices on R&D and Innovation.
- The country has engaged The World Academy of Sciences (TWAS) to assist with the development of a national Women In Science Engineering and Technology (WISET) chapter in line with Regional Frameworks and Strategies
- The country is in the process of developing an Indigenous Knowledge System (IKS) Policy in line with the SADC Frameworks and Strategies

24. MALI

There are 5 public universities and also private ones. There are also doctoral schools. Research is conducted at the level of universities, research institutes, but there are also isolated/independent inventors. The universities are attached to the Ministry of Higher Education and Research but the institutes are attached to other sectoral departments (Agriculture, Livestock and Fisheries, Health). The research themes vary and are related to Agriculture, Health, Livestock and Fisheries, Energy, etc. The Government has set up the Competitive Fund for Research and Innovation at the rate of 2 billion FCFA per year. The Government has also adopted the STI policy. As emerging technologies, Mali has: (a) a robotics centre that was created in 2017 that also seeks to develop artificial intelligence; and (b) Biotechnology laboratories working in the field of agriculture, health. Mali is developing partnerships with several African and European countries in higher education and research and still remains open to all forms of collaboration at the level of the African Union for STI. The texts establishing the National Agency on Quality Assurance were also adopted by the Government. One of the missions of our department being scientific culture, there are each year celebration of Sciences in December; the African Scientific Renaissance Day in June, and also Miss Science in September. The government has put in place the Best Inventor Award.

25. BURKINA FASO

The government considers STI important has instituted a Scientific Council. One of the mandate of the council is to see to the valorization of research findings to make sure this contributes to the socio-economic development of the country. The country has a strategic plan for financing research and innovation contribute significantly on the development and wellbeing of the population. It has contributed to the financing of 50 projects. Research is also an active endeavor within the country's universities. The country has a plan on health which has a research component. The country has 4 centers

of excellence including a center on water and energy as well as the environment. The country has plans for national hubs.

ANNEX 2: UPDATES AND DISCUSSIONS ON IMPLEMENTATION OF STI INITIATIVES OF PARTNERS INSTITUTIONS

1. The United Nations Educational, Scientific and Cultural Organization (UNESCO)

In view of the high importance given by UNESCO to the AUC's STC-EST meeting, UNESCO was very well represented in the meeting, including through the participation of the President of the Science Commission of the 40th UNESCO's General Conference, Prof Stephen Simukanga from Zimbabwe.

In terms of key STI initiatives of UNESCO focusing on the implementation of the Agenda 2063 and the 2030 Agenda, UNESCO referred to a number of key actions in four STI priority areas: Strengthening inclusive STI systems & governance; Promoting basic sciences & building STI capacity; Promoting sustainable management of natural resources and Ensuring water security.

UNESCO noted its technical support for the 5 year work plan of STISA 2024 and for the evaluation and monitoring of STISA 2024 with AOSTI. UNESCO highlighted its assistance to Member States, including more than 25 African countries, in terms of developing, reviewing, implementing & monitoring inclusive and gender transformative STI policies. UNESCO in partnership with SADC Secretariat and SADC Parliamentary Forum has instituted a regional programme on Capacity building for Parliamentarians in STI policy legislation to enhance SADC industrialization strategy. It also noted the successful cooperation with UN and AUC on Developing STI for SDGs roadmaps, including in 3 pilot countries in Africa (Ethiopia, Ghana- led by UNESCO and Kenya), as well as its partnership with L'Oréal to promote women in science and numerous initiatives in capacity building in STEM across the continent.

In the field of water security, UNESCO noted its actions in the context of its Intergovernmental Hydrological Programme (IHP), including actions on drought monitoring and risk prevention. UNESCO also presented the Man and the Biosphere

programme, an intergovernmental scientific programme aiming at reconciling Conservation of Biodiversity and sustainable and equitable use of natural resources for community wellbeing. This programme works in Biosphere reserves (BR) which are learning sites for sustainable development. There are currently 701 BRs in 124 countries including 21 transboundary sites worldwide with 79 RBs in 29 countries in Africa. Submitted by African countries, a resolution has been adopted by UNESCO Member States in 2017 for the creation of a special fund (AfriBioFund) which would foster contribution of MAB African biosphere reserves as sites for science for sustainability generating knowledge on conservation and development integrated innovative approaches. The Fund would positively impact the life of over 22 million people. AfriBioFund would be a major contribution to assist African Member States in implementing Agenda 2030 and its SDGs and AU Agenda 2063. UNESCO is already getting the support of AfDB for the feasibility study of the fund. UNESCO is calling upon AU to endorse the creation of this fund as joint a UNESCO-AU regional initiative. Finally, UNESCO emphasized the game changing potential of Open Science in Africa for reducing the existing inequalities in STI and accelerating progress towards the implementation of the Agenda 2063 and the achievement of SDGs. In this context, UNESCO will be taking the lead in building the global consensus on open science through a consultative and inclusive process to develop a new international standard setting instrument on Open Science - the UNESCO Recommendation on Open Science to be adopted by the UNESCO General Conference in 2021. UNESCO invited the STC experts, Ministers and the AU to actively contribute to the process.

2. UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA (UNECA)

In terms of consensus building, ECA organized the first Africa Regional Science, Technology and Innovation Forum on 16 April 2019 in partnership with the Department of Science and Technology (DST) of South Africa on 16 April 2019. The Forum included high-level panels of ministers, senior public and private sector leaders, academia and senior representative of the United Nations entities. The outcomes presented a strong and united African voice at the High Level Political Forum as well as the Multi-stakeholder Technology Facilitation Mechanisms. The second ARSTI Forum is scheduled for 23-24 February 2020 in Victoria Fall – alongside the African Regional Forum on Sustainable Development. In addition, ECA convened the annual Africa Regional component of the World Summit on the Information Society (WSIS) in Cameroon. The outcomes will inform the global WSIS.

In terms of building technical competencies, the ECA-inspired African Biomedical Engineering Consortium has now over 20 university partners in Africa that have either adopted or refined their existing biomedical engineering (BME) based on the BME generic curriculum. Over 2200 students are currently enrolled in the programmes of partner universities. The initiative includes an innovators design school that builds the technical, innovation and entrepreneurship skill which has benefited close to 200 students with a third of the students being females. The recent one was hosted by Uganda Industrial Research Institute (UIRI) and ABEC. Students learned how to invent (i.e. bring their concept to life from first principle), assemble (e.g. 3D Printers), programme the different sensors (e.g. in a phone) and secure, store and share data, among others.

The first global open source platform for open innovation was operationalized, one medical device has completed the first stage of clinical trials and youths in Uganda organized their third stakeholders innovation conference for improved healthcare outcomes. In addition, ECA is supporting Guinea in piloting a platform for digitalization of tax assessments and administration in Guinea; support to Cameroon and Ethiopia to expand their broadband infrastructures.

In terms of policy development, ECA has launched three major policy research work: a) Harnessing Emerging Technologies for Improved Transportation in Africa with a focus on digital technologies, nanotechnologies and advanced energy technologies – three technologies that promise to revolutionize the transport industry; b) mobilizing funding for innovation and entrepreneurship – taking into account Africa’s youthful population and c) Policy Design and Implementation – noting that most national STI policies may be inadequately designed and the implementation process is often missing. The main aim is to generate knowledge that can help both member States and ECA, to inform policy making in emerging technology and private sector development.

3. AFRICAN DEVELOPMENT BANK (AfDB)

The contribution of AfDB to the implementation of STISA-24 is in the following areas: Post- secondary TVET, STI, HESTI with a focus on women and girls; policy- organize STI forum together with partners e.g. preparation for the 2020 STI forum is under way; Innovations financing for Education in Africa (300m fund- AfDB has been requested by AUC a result of COMEDAF III and COMEDAF III +Assembly/AU/Dec.174 (X) which declared the necessity of AEF. Furthermore, AfDB is involved in establishment of the African Education Fund- an innovative Financing mechanism owned and managed by the Africans. The design of the fund has been done in consultation with member States. Member state will be required to make one off financial commitment (USD 2-5 million) for the operationalization of the fund. The focus of the fund is TVET, STEM, Higher

Education, Research and innovation. Another area of contribution is in the Development Project financing- focused on Higher education and TVET (Infrastructure development and Human capital development- targeting AUC, RECs and member countries. AfDB support to the Pan African University, Science and Technology Technological Higher Education Project in Egypt – USD 50m; Kenya – Technical Education and Youth Entrepreneurship Project – USD 115m; East African Nutrition Science in Burundi – USD 8.3m are some of the examples.

4. AFRICA ACADEMY OF SCIENCES (AAS)

The AAS presentation aimed to provide updates on the progress made in the implementation of its STI initiatives. The presentation outlined AAS' history, reason for existence and current strategic priorities until 2022. Key was a discussion on the AAS' tripartite mandate which is: 1) promoting excellence through recognition of outstanding scientists; 2) providing think tank and advisory services; and 3) implementing key STI programmes. On the first mandate, the presentation discussed progress made in engaging her fellows and affiliates who have grown in number and in gender diversity. It also appreciated the formation of a mentorship scheme aimed at providing targeted interaction and coaching support to upcoming scientists. On the second mandate, the presentation made note of the advancement made by AAS fellows in promoting knowledge dissemination across topical areas of interest. AAS fellows have organized themselves into 16 topical groups, reflecting issues that are relevant to the continent. On the third and final mandate, the presentation discussed four key platforms that have been formed to support programmatic implementation i.e. programmatic, agenda setting and funding platform (Alliance for Accelerating Excellence in Science in Africa), sustainability platform (The Coalition for African Research and Innovation), publishing platform (AAS Open) and financial, governance, HR and procurement platform (the Global Grant Community). AAS discussed achievements realized working across these platforms in four programmatic areas: building R&D leadership and infrastructure, innovation and science entrepreneurship, supporting rising research leaders and filling critical gaps within the R&D ecosystem (including public engagement, science communication and research management). AAS further highlighted areas for engagement with African governments; covering policy dialogue, advocacy and funding. AAS invited delegates to support AAS initiatives in order to advance the STISA agenda and enhance lives on the continent through science.

5. SANSA: Science, Technology and Innovation Initiative – South African National Space Agency (SANSA), South Africa, Presented by Dr Lee-Anne McKinnell, SANSA

The presenter informed that Space Weather refers to conditions on the Sun and in the solar wind, magnetosphere, ionosphere, and thermosphere that can influence the performance and reliability of space-borne and ground-based technological systems. She noted that Space Weather is a real risk to communication, navigation, and electronic systems and can cause increased radiation exposure at aviation altitudes and above.

SANSA in South Africa has been developing a capability in Space Weather operations and research over the past 10 years. The SANSA Space Weather Centre is a member of the International Space Environment Service (ISES) and has recently been designated as a Regional Space Weather Information Provider for Africa by the International Civil Aviation Organisation (ICAO). Over the next 3 years SANSA will be expanding operational space weather, as well as data networks to achieve the aim of a real time operational service for Africa.

South Africa is therefore inviting African partners to endorse SANSA's capability, and join this initiative to protect Africa's interest in the global challenge that is Space Weather.

6. PASET Regional Scholarship and Innovation Fund, International Centre of Insect Physiology and Ecology (icipe)

The presenter noted that there were various regional initiatives that countries were party to, for which need to be captured as part of implementation of STISA. An important one is the Partnership for skills in Applied Sciences, Engineering and Technology, facilitated by the World Bank, and which aims to contribute to training 10,000 African PhDs in strategic areas that are important for the Continent's development. Eight AU member countries are currently participating (Senegal, Kenya, Rwanda, Ghana, Cote D'Ivoire, Ghana, Burkina Faso and Benin) in PASET. Nigeria and Mozambique are in the process of joining the initiative.

7. AFRICAN COMMISSION FOR NUCLEAR ENERGY (AFCONE)

The Pelindaba Treaty (African Nuclear Weapon Free Zone) created a mechanism for compliance through the establishment of the African Commission on Nuclear Energy, referred to as AFCONE. The African Member States have also realized the enormous benefits that the peaceful application of nuclear science and technology hold for the economic and social development of the continent. The AFCONE priority is given to the most pressing needs of the States Parties: Peaceful nuclear applications, Radioactive waste management, Safety, Security and Safeguards

The nuclear science and technology is an issue of special interest for Africa. AFCONE will support, with its partners, Research, Development and Training Programmes, in order

to address each of the Pelindaba Treaty provisions, in particular the development of Peaceful Nuclear Applications and Safety, Security and Safeguards, including the R & D related.

African Ministers and Officials issued a Declaration on 10 January 2007, at the meeting in Algiers held in the framework of the High-level African Regional Conference on the contribution of nuclear energy to peace and sustainable development, which outlined priorities for Africa on this issue. **The Declaration and Plan of Action have been adopted by the African Union Summit in January 2007.**

The implementation of the Pelindaba Treaty is underpinned by important nuclear-related initiatives already on-going on the Continent. These include the important work being done by the African Regional Cooperative Agreement (AFRA operational since 1990) to enlarge the contribution of nuclear science and technology on the African continent, in co-operation with the IAEA. The State Parties to the Pelindaba Treaty are implementing more or less large scale national programs on peaceful applications of nuclear energy: Human Health, Agriculture and Animal Health, Isotope Hydrology, Industry, Environment, Nuclear Power and Energy Planning. AFCONE aims to support Education & Training and Nuclear Research and Development activities with an emphasis on continually improving nuclear safety, security and safeguards notably to contribute to the integration of the nuclear power within the regional energy mix system in a safe, efficient and secure manner.

8. The International Atomic Energy Agency (IAEA)

The International Atomic Energy Agency (IAEA) was established as an autonomous organization under the United Nations in 1957 and is the only organization within the UN system with expertise in nuclear technologies. In implementing its Atoms for Peace and Development mandate, the Agency works closely with Member States, United Nations partners and development agencies.

The technical cooperation programme is the major IAEA mechanism for transferring nuclear technology to Member States, helping them to address key development priorities in seven areas of work: health and nutrition, food and agriculture, water and the environment, industrial applications and radiation technology, energy planning and nuclear power, radiation protection and nuclear safety and security, and nuclear knowledge development and management.

Work under each of these areas takes place through the implementation of projects designed to address development priorities identified by Member States and to have a sustainable socioeconomic impact. Projects are selected and prioritized based on national ownership and the existence of an enabling environment, which guarantees that they enjoy strong support from the government(s) involved.

The African Regional Cooperative Agreement (AFRA) is an intergovernmental agreement established in 1990 by the IAEA and African Member States to further strengthen and enlarge the contribution of nuclear science and technology to socioeconomic development on the African continent. A number of regional designated centre and networks have been set up under AFRA, with the support of the IAEA various thematic areas including; on food security, animal health the Veterinary Diagnostic Laboratory (VETLAB) Network, Radiation safety, Radiotherapy and Medical physics.

In general, the programme concentrates on building capacity through provision of fellowship programmes, expert services and provision of equipments, where innovative methods to address national development challenges are most needed. A Practical Arrangements covering a four-year period (2018-2022) between the IAEA and the African Union Commission signed in 2018 provide a framework for facilitating training and capacity building support, provision of experts and utilization of laboratory and analytical facilities in support of African country priorities in various applications of nuclear technology including. In 2019, The Agency also signed a Practical Arrangements with the African Commission on Nuclear Energy (AFCON) to work closely together in advancing the peaceful application of nuclear science and technology in Africa.