

EAST AFRICAN COMMUNITY EAST AFRICAN SCIENCE AND TECHNOLOGY COMMISSION (EASTECO)

THE EAC REGIONAL STI RESEACH **AND DEVELOPMENT AGENDA 2020-2030**















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Forward

it is my pleasure to present to you the first East African Community (EAC) Regional Research Agenda 2020 - 2030, which is an initiative of the Partner States of the East African Community coordinated by the East African Science and Technology Commission (EASTECO). This Research and Development Agenda encapsulates the aspiration of the EAC aimed at widening and deepening regional integration and fostering socio-economic development through addressing common regional Science, Technology and Innovation (STI) research and development priorities. The agenda will ensure a harmonized and well-coordinated STI research that synergistically addresses regional challenges through generating evidence-based solutions to enhance socioeconomic development. The regional research agenda is designed to respond to regional research and development (R&D) system and realities within the landscape in the Partners States. In acknowledging that regional development priorities are dynamic and heavily impacted by externalities, this STI research and development agenda has adopted a ten-year implementation timeframe that allows lessons learnt and emerging issues to be incorporated as we look forward to a vibrant EAC regional research area by 2030.

The development of this regional STI research agenda was informed by global, continental and regional development plans, polices and strategies including the aspirations of the Sustainable Development Goals (SDGs); the African Union Agenda 2063; the Science, Technology and Innovation Strategy for Africa 2024; the East African Vision 2050; the East African Community 5th Development Strategy; the EAC Common Market Protocol of 2010; and the EAC Science, Technology and Innovations Policy 2019. The Agenda is therefore a robust roadmap for STI research and development that will steer and align the EAC region to the continental and global development pathway. I commend Partner States for their contributions during the development of this STI Research Agenda. I wish EASTECO successful coordination of this agenda as it seeks to fulfil its mandate of promoting and coordinating the development, management and application of STI in socio-economic development and regional integration in the EAC.

CHAIRMAN

EASTECO GOVERNING BOARD

Preface

The Treaty for the establishment of East African Community acknowledges the contribution of Science, Technology and Innovation (STI) as drivers for sustainable socio-economic development in Articles 5, 12 and 103. The Treaty further directs Partner States to promote co-operation in the development of science and technology within the Community through joint establishment and support of scientific and technological research and institutions in disciplines of science and technology.

The region- however, faces a number of challenges in the development, management and application of STI research including (i) weak linkages to private sector needs; (ii) minimal regional collaboration; (iii) low quality outputs; (iv.) limited dissemination of outputs; (v) poor R&D infrastructure; (vi.) inadequate R&D human resource; and (vii) poor STI R&D coordination mechanism among others. Common regional STI research and development agenda is, therefore, geared towards addressing these challenges.

In addition, the common agenda will ensure reduced duplication of efforts; enhance synergy and complementarity; enhanced collaboration and partnerships; and judicious use of scarce resources for increased socio-economic development and regional integration.

The ST Research and Development Agenda consists of six thematic priorities including

- 1. Agriculture, animal industry and food security systems;
- 2. Health and Nutrition;
- 3. Energy, Industrialization and Trade;
- 4. Natural Resources Management and Climate Change;
- 5. Indigenous Knowledge and Technology; and
- 6. Information and Communication Technology and Digital Economy.

The themes are further broken down in to priority sub themes. Development of this regional STI research and development agenda involved consultations of a wide range of stakeholders in the STI ecosystem at national and regional levels. Contributions of the national stakeholders were discussed at the regional level and the output was a draft STI research and development agenda which was then subjected to regional validation process before approval through the EAC decision making system.

Although the STI Research and Development agenda has a ten-year horizon, it will be subjected to a mid-term evaluation and lessons learnt will be used to redirect and improve the program. It is my sincere hope that the Regional STI Research and Development Agenda will coalesce the Partner States into a single regional research area and benefit from economies of scale in R&D.

EXECUTIVE SECRETARY

EASTECO

1. Background

- The East African Community (EAC) is a regional inter-governmental organization comprising the Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and Uganda. The Vision of the EAC is to attain a prosperous, competitive, secure, stable and politically united East Africa. The Mission is to widen and deepen economic, political, social and cultural integration in order to improve the quality of life of the people of East Africa through increased competitiveness, value added production, enhanced trade and investments.
- 2. The contribution of Science, Technology and Innovation (STI) to socio-economic development is recognized by the Treaty for the Establishment of East African Community. In particular, Articles 5, 12 and 103 of the Treaty identifies Science and Technology as drivers for achieving sustainable socio-economic development. The Treaty further directs the Partner States to promote co-operation in the development of science and technology within the Community through joint establishment and support of STI R&D activities and institutions in the various disciplines of science and technology, among others.
- 3. The East African Science and Technology Commission (EASTECO) was established in 2007, as a semi-autonomous institution of the East African Community mandated to promote and coordinate the development, management and application of Science and Technology in the Partner States. The Protocol establishing EASTECO defines the Commission as the main regional agency through which the EAC Partner States will develop and implement common Science and Technology policies, programs and projects in priority areas that include human resources development, collaborative research, technology development and innovation.
- 4. The Vision of EASTECO is to contribute to a prosperous, competitive, secure and united East Africa through collaboration in science, technology and innovation. The Mission is to promote and coordinate the development, management and application of science and technology to support regional integration and socio-economic development
- The EAC Vision 2050 identifies STI as key drivers and enablers of sustainable socio-economic development and transformation. It also

recognizes the need for creating an enabling environment to initiate, develop, support and sustain the application of STI. The Vision defines six broad pillars, including Infrastructure Development; Agriculture, Food Security and Rural Development; Industrialization; Natural Resources and Environment Management; Tourism, Trade and Services Development; and Human Capital Development. STI, as enabler, is expected to support these pillars to ensure sustainable production of goods and services and enhance economic competitiveness of the region.

- 6. Investments in STI through R&D portfolio in the region has largely been guided by priorities derived from national policies and development plans of individual Partner States. The EAC region therefore requires a common STI R&D agenda that addresses common cross boundary issues in a harmonized and well-coordinated manner for increased synergy and return on investment in R&D.
- 7. The EAC R&D landscape, however, experiences a number of challenges, including i) weak linkage with the private sector; (ii) minimal regional collaboration; (iii) low quality output; (iv.) limited dissemination of outputs; (v) poor infrastructure; (vi.) inadequate human resource; and (vii) poor coordination mechanism among others. The common research and development agenda is geared towards addressing these challenges, in addition to reducing duplication of efforts; leveraging synergy; fostering collaboration and partnerships; and ensuring judicious and sustainable use of scarce resources for increased socio-economic development and achieving regional integration.
- 8. While implementing this Research and development Agenda, EASTECO will work in collaboration and partnership with institutions of the EAC including Inter-University Council for East Africa (IUCEA), Lake Victoria Fisheries Organization (LVFO), Lake Victoria Basin Commission (LVBC) and the East African Health Research Commission (EAHRC). In addition, the Commission shall work in partnership with national commissions/ councils of science and technology, national and international research centres/institute, universities, private sector and the international development partners.
- Activities undertaken while implementing the regional research and development agenda shall observe the intellectual property (IP) laws and international protocols, to which EAC Partner Stats are signatory. In

addition, it shall adhere to EAC Partner States' IP laws and regulations. The Agenda shall also observe ethical requirements and considerations in all its projects and programs.

- 10. The overall objective of the regional STI R&D agenda is to provide common regional research themes and research priority areas to facilitate harmonized and coordinated research that addresses regional challenges and aspirations for regional integration and attainment of socio-economic development.
- 11. The specific objectives are to:
 - i. Prioritize regional research and development for preparation of evidence- based policies;
 - ii. Guide the focus of STI and R&D stakeholders in Partner State on research priority areas;
 - iii. Promote multi-disciplinary and collaborative approaches in STI R&D:
 - iv. Guide resource allocation to priority STI R&D areas and enhance regional competitiveness through value addition;
 - v. Integrate STI R&D in priority sectors of development;
 - vi. Leverage synergy and complementarity in STI R&D in the region
- 12. The regional STI R&D agenda was developed in consonance with the global, continental and regional development plans, polices and strategies. In addition, the following were considered: the aspirations of the Sustainable Development Goals (SDGs); the African Union Vision 2063; the Science, Technology and Innovation Strategy for Africa 2024; the East African Vision 2050; the East African Community 5th Development Strategy; the EAC Common Market Protocol of 2010; and the EAC Science, Technology and Innovations Policy 2019.
- 13. The regional STI R&D agenda was developed through a consultative process involving STI and R&D stakeholders from the Partner States' Ministries of East African Community Affairs; National Councils/ Commissions of Science Technology and Innovation; Departments of Education, Science, Technology and Innovation; Universities and other higher education institutions; National R&D institutions; Industrial Research Institutions; and civil society organizations among others. The draft was subjected to regional validation by stakeholders before approval by the Council.

- 14. In implementing the regional STI R&D priorities, the Partners States and R&D Stakeholders considered and integrated cross cutting issues including Gender, Equity, Capacity Development, Research Ethics, and Intellectual Property Rights. In addition, biosafety, biosecurity, bio piracy, environmental conservation and sustainable use of natural resources were incorporated.
- 15. These research priorities will be reviewed every five years and subjected to mid-term and terminal evaluation. In addition, a rolling strategic plan will be developed to support the implantation of the Agenda. However, routine internal monitoring, evaluation and learning (MEL) will be conducted to improve the operational efficiency and effectiveness during implementation. It is expected that Partner States will streamline their national R&D agenda and frameworks to reflect the common research interests in the regional research priorities to enhance harmony and leverage synergy in regional R&D.

2. The Regional Research Themes

The following six research themes, ranked in order of priority, were agreed upon as the Regional STI R&D Agenda in the next decade (2020 – 2030):

- 1. Agriculture, Animal Industry and Food Security Systems
- 2. Health and Nutrition
- 3. Energy, Industrialization and Trade
- 4. Natural Resources Management and Climate Change
- 5. Indigenous Knowledge and Technology
- 6. Information Communication Technology and Digital Economy

2.1 Theme 1: Agriculture, Animal Industry and Food Security Systems

Agriculture is the mainstay of the economies of all the EAC Partner States, contributing an average of 27 percent to the regions gross domestic product (GDP). The sector is the major source of foreign exchange and food supply, and employs over 70 percent of the rural population. Investments in agriculture have high multiplier effects, particularly in terms of employment creation and supply of agro-industrial raw materials. However, the sector needs fundamental policy commitment and investments in order to contribute effectively to broadbased growth needed for poverty eradication and enhancement of regional food and nutrition security. The common challenges facing agriculture in all the EAC Partner States include low productivity; high post-harvest losses; limited value addition through processing and poor natural resource management which exacerbates vulnerability to climate change-related risks. EAC Vision 2050 focuses on promoting improved agricultural interventions with emphasis on greater diversification of domestic-oriented production and value addition. The EAC harmonized Agricultural and Rural Development Strategy 2005-2030 addresses challenges of food insecurity and poverty reduction in the region through improved agricultural production and farm incomes to ensure availability of and access to food by all households. The aim of R&D in agriculture, animal industry and food security systems is to harmonize agricultural policies and regulation; liberalize cross-border trade in agricultural produce and products; enhance markets and marketing infrastructure; increase production of crops, livestock and fisheries; attain food security; reduce post-harvest losses; promote value addition through agro-processing; and protect human, animal, plant and environmental safety.

The following research areas were prioritized under the research theme "Agriculture, Animal Industry and Food Security Systems":

- (i) Crop production
- (ii) Livestock production
- (iii) Postharvest processes and technologies
- (iv) Fisheries and aquaculture
- (v) Agribusiness
- (vi) Agricultural extension
- (vii) Climate Smart Agriculture

2.2 Theme 2: Health and Nutrition

Health and Nutrition contribute to the socioeconomic transformation of the East African region. The region is currently undergoing major health transformations, powered by changing human-animal-environmental interactions; population dynamics; and socio-economic development. Better health is central to human well-being, and well-nourished, healthy workforce is a vital asset for sustainable development. Foods and nutrients are the most important environmental factors influencing growth, development, functional abilities, and health. Nutrition plays a critical role in human resource development as deficiencies in essential nutrients lead to malnutrition, which affects mental and physical state, resulting in poor health and poor work performance.

The East Africa region, like other low and middle-income regions, is experiencing a concurrent triple burden of common infectious diseases such as Tuberculosis, HIV/AIDS and the neglected tropical diseases (NTD) including Schistosomiasis, Onchocerciasis, and Cysticercosis; non-communicable diseases including malaria, cardiovascular diseases, diabetes and cancers; and epidemic and pandemic diseases related to increasing globalization, trade and climate change such as Influenza, Ebola, Hepatitis B, Yellow Fever and Rift Valley Fever (RVF) and COVID -19. Interventions at the levels of disease surveillance, prevention and management require reliable data and information from research and innovation. There is a need to conduct research in diagnostics, development of new drugs and vaccines, drug resistance, vector control, risk factors of noncommunicable diseases including mental health; reproductive health including maternal and child health, micronutrient deficiencies, bio-fortification, dietary behaviour and indigenous foods.

The following research areas were prioritized under research theme "Health and Nutrition":

- (i) Communicable Diseases
- (ii) Non-Communicable Diseases
- (iii) Maternal & Child Health and Reproductive Health
- (iv) Nutrition and growth
- (v) Medicines and Vaccines
- (vi) Environmental Health
- (vii) Community Health Systems
- (viii) Biomedical Engineering and E-health, Disability and rehabilitation
- (ix) One Health
- (x) Livestock and wildlife health

2.3 Theme 3: Energy, Industrialization and Trade

One of the constraints to industrialization in EAC region relate to low energy generation capacity and conservation. Other challenges, include low coverage and high tariff costs. The region has the lowest per capita power generation and electricity access rates on the African continent, and has lagged behind in developing a regionally integrated vision for a power pool. The region, therefore, needs to increase and diversify sustainable renewable energy sources and production to support industrialization and trade. The region has, however, developed the East African Industrialization Policy, which aims to enhance industrial production and productivity and to accelerate structural transformation of economies of the EAC region as a stimulant for sustainable wealth creation, improved incomes, and a higher standard of living for the citizens.

The policy advocates for enhancing the contribution of the manufacturing sector to the regional GDP; diversifying the manufacturing base through increased value addition; and increasing the share of manufactured exports relative to imports. Manufacturing is a key sector in the industrial sector in the region since it has both forward and backward linkages with multiple industries. The development and transformation of labour intensive manufacturing in East Africa is a priority for the region, especially in cotton, textiles and apparels; livestock, leather and footwear; and agro-food (dairy, cereals, fruits and vegetables) sub sectors. These three sectors account for over 70 percent of the value addition, exports and employment in the region. Industrial growth in the region will expand trade and export in industrial goods to achieve structural transformation of regional economies through high value addition and product diversification based on the comparative and competitive advantages of the region.

Research and development shall, therefore, act as an enabler for sustainable energy production, conservation and use, increased industrial production and heightened trade within and across the Partner States, and globally. The following research areas were prioritized under the research theme "Energy, Industrialization and Trade":

- (i) Enhancement of manufacturing competitiveness
- (ii) Export driven manufacturing
- (iii) Technology development, transfer and commercialization
- (iv) Diversification of manufacturing
- (v) Integration of regional manufacturing values chains
- (vi) Clusters and incubation development
- (vii) Development and harmonization of regional standards
- (viii) Renewable energy sources and technologies
- (ix) Energy conservation and efficiency
- (x) Electrification for rural industry development
- (xi) Enhancement of regional trade facilitation

2.4 Theme 4: Natural Resources Management and Climate Change

The aim of EAC Vision 2050 is to achieve effective natural resource and environment management and conservation with enhanced value addition. The vision identifies judicious use of the natural resources and emphasizes value addition to enhance forward and backward linkages to generate employment and trade within the region, and to expand the export market. The 5th EAC Development Strategy 2017/18 – 2021/22 further acknowledges that natural resources are impacted by climate change and natural disaster risks that require research interventions for better management. The climatic changes and increasing depletion of fossil fuel sources require a shift in economies to be based largely on renewable resources. Transition to a sustainable bio-based economy is, therefore, imperative in securing sustained regional economic prosperity.

Cutting-edge biological and technological knowledge and approaches for intensive and sustainable production, provision and processing of biomass will help to bring about this change in the industrial resource base and contribute to reduced burden on the environment and contribute to conservation of the finite resources.

Bioeconomy offers opportunity to reconcile economic growth with environmentally responsible investments and actions. To ensure judicious utilization of natural resources in the face of climate change, research interventions in this thematic area will focus on conservation and management of trans-boundary ecosystems; wildlife management; biodiversity conservation initiatives; water governance and management; pollution management; judicious exploitation of forestry and mineral resources; and efficient bioeconomy to track the region on the path to sustainable socio-economic prosperity and global competitiveness. The following research areas were prioritized under the research theme "Natural Resources Management and Climate Change":

- (i) Biodiversity
- (ii) Fisheries and Aquaculture
- (iii) Forestry and agroforestry
- (iv) Oil, Gas and Minerals
- (v) Resilience and adaptation to climate change
- (vi) Waste management
- (vii) Water resources
- (viii) Wildlife and Tourism

2.5 Theme 5: Indigenous Knowledge and Technology

Indigenous Knowledge and Technology (IKT) refers to intricate knowledge and technology systems acquired over generations by communities as they interact with the environment. It encompasses technological, economic, philosophical, learning and governance systems, and is embedded in naturalistic epistemologies and belief systems, which differ radically from those of scientific systems. The Treaty for the establishment of East African Community, in Article 103 section 1 (c), commits Partner States to promote development and use of indigenous science and technologies. Article 118 (h) on Health also commits Partner States to promote the development of good nutritional standards and the popularization of indigenous foods. Pursuit of research programs in IKT in the region will reignite the harmonization of modernization and development, in which the cultural and socioeconomic knowledge and technologies of indigenous peoples were lost. Indigenous knowledge and technology system has value for the culture in which it evolves, globally mainstreaming it in scientific validation process and protecting it through intellectual property regimes. In the EAC, the need to recognize IKT is paramount for economic and cultural empowerment of indigenous people in particular, and for enriching modern scientific knowledge and innovations for regional socio-economic development.

Indigenous communities in east Africa possess rich traditional knowledge expressed in many practices in their communities. This theme has potential to provide a comparative advantage to the region if well documented and researched to harness products and processes for socio-economic development and global competitiveness in trade. The IKT research presents a unique opportunity as part of the trans-disciplinary, multi-collaborative and participatory research to enrich the regional research system in East Africa. It further presents a distinctive link between the formal private sector and the local communities as it is largely unexplored. Formation of partnerships between the private sector, academia and indigenous communities to pursue development of novel IKT based products is fundamental in IKT research in areas such as medical ethnobotany ethno-zoology, pharmaceutical and nutraceutical products; and use of traditional artefacts in architecture, engineering, art, design and music industries among others. IKT will contribute to regional integration and socioeconomic development. The following research areas were prioritized under the research theme "Indigenous Knowledge and Technology":

- (i) Traditional ecological knowledge and technologies
- (ii) Farming and food systems including indigenous food processing
- (iii) Medical, pharmaceutical and environment knowledge and technologies
- (iv) Construction and infrastructure development technologies
- (v) The IKTS shall be harnessed through the following processes:
- (i) Inventorization of ethnobotanical, ethnozoological and other forms of IKT Systems
- (ii) Scientific validation of inventorized IKT Systems
- (iii) Conservation and promotion of validated IKT Systems
- (iv) Registration and mainstreaming of validated IKT through IP regimes
- (v) Integration of IKT in curricula, R&D and Innovation Systems

2.6 Theme 6: Information Communication Technology and Digital Economy

The Information Communication Technology (ICT) is a fundamental infrastructural facility and application system in the current globalized economy. It is the major contributor to the 4th industrial revolution. Access to and usage of ICTs is essential for enhanced socio-economic development of the citizens in the EAC.

There are indications of steady and impressive developments in ICT infrastructure and services in the Partner States, as exemplified by fixed voice and mobile subscriptions; access to and utilization of backbone carrier networks; access to radio and television broadcast services; access to and use of internet services; and tariffs on communications services, although a lot more still need to be done. With the exception of fixed voice telephony and postal mail services, both of which are declining, all other available access indicators point to sustained growth in the sector across the region.

For instance, mobile Phone penetration is steadily increasing in all Partner States, with current penetration rates ranging between 50 percent and 75 percent. The major challenge in ICT in the EAC is in the application to address a myriad of challenges faced in the region by business, governance, security, health, and food security among others. It is, therefore, imperative for the region to embrace digital economy based on digital computing technologies. It is well known fact that embracing digital economy reduces costs of doing business while increasing the competitiveness of locally produced goods and services in the international market. Research and development in ICT application in all sectors of the economy is crucial if the region is to attain its vision of becoming an upper middle economy by 2030. The major areas of research, development and innovation, guided by the regions competitive advantages are the service and productive sectors. These areas require ICT technological interventions to further catapult them through increased efficiency and effectiveness. The following research areas have been prioritized under the research theme "Information Communication and digital Economy":

- (i) Artificial Intelligence
- (ii) Embedded systems
- (iii) ICT for X (government, commerce, agriculture etc.)
- (iv) Internet of things
- (v) Digital services
- (vi) Efficient computing technologies and algorithms
- (vii) Data analytics and big data
- (viii) Cyber security
- (ix) Satellite technology

3. Governance of the Research Agenda

This includes structures, systems and functions that support efficient and effective promotion and coordination of regional research and development within the EAC regional research system. The EAC regional research system consist of Partner State actors, together with the enabling policy and regulatory support and coordination arrangements. In addition, it includes the regional arrangements that facilitate a coordinated approach to promotion of research and development in the EAC region. The Regional STI R&D Agenda shall be governed as follows:

3.1 Regional Research and Development Working Group (RDWG)

- The Regional STI Research and Development Working Group (RDWG) is the General Assembly of all R&D stakeholders in the EAC region. In addition, R&D stakeholders from beyond the EAC regions shall be co-opted as special members where the working group deems it necessary and mutually beneficial.
- The purpose of the RDWG is to stimulate dialogue on STI R&D
 among the stakeholders; promote partnerships; guide collaborativemultidisciplinary research programme and project priorities;
 promote dissemination of research outputs; and undertake resource
 mobilization to support R&D activities.

3.2 Regional Research and Development Advisory Committee

- The Executive Committee of the RDWG shall be the Regional STI Research and Development Advisory Committee (RDAC). Membership to RDAC shall comprise members of the technical subcommittees constituted competitively.
- Research Grants Sub Committee shall provide the technical guidance and advice on investments in STI Research and Development; guide technical implementation of research grants programmes; and monitor regional STI research programs in accordance with policies and regulations of the commission;

- Research Communication Sub-Committee shall facilitate the exchange
 of scientific data and information among the scientists participating
 in the R&D programmes and projects as well as relevant scientific
 institutions and agencies including academia, industry, civil societies,
 governments and private sector in the Partner States, regional and
 international levels.
- 4. Resource Mobilization & Planning Sub-Committee shall advise on strategies to raise resources for R&D and for planning of activities of the RDAC and RDWG, including development of regional grant instruments such as concept notes; proposals for negotiation with development partners to support R&D activities in the region.
- 5. The sub-committees shall elect the chairman at the first sitting, and the tenure of the chairman shall be a non-renewable term of five years.
- 6. The sub-committees shall be supported by the Commission Secretariat, through the office of Scientific Research and Development.

4. Monitoring Evaluation and Learning

The efficiency and effectiveness of the Regional STI Research Agenda shall be monitored and evaluated periodically through the Logical Framework Mechanism (LFM). The LFM shall adopt the results-based management (RBM) format. Lessons learnt from the annual monitoring, evaluation and learning (MEL) process will be used to redirect and improve the Agenda and applied in resource allocation. In addition, external mid-term evaluation will be conducted in year 5 and the findings used to reorient and improve the program. Summative evaluation of the performance of the Agenda will be conducted by external experts in year 10 and the findings used to design a follow up 10-year phase 2 of the Agenda.

