DRAFT CONCEPT NOTE AND AIDE MEMOIRE

EXPERT GROUP MEETING

ON

Building Research infrastructure capacity in Africa to achieve the SDGs

ORGANIZED

BY

NEW TECHNOLOGIES AND INNOVATION SECTION
SPECIAL INITIATIVES DIVISION
UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA
ADDIS ABABA
ETHIOPIA

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Summary

Science, technology and innovation (STI) are singled out in the United Nation's Agenda 2030-Sustainable Development Goals (SDGs) as one of the means of implementation of the sustainable development agenda. The degree to which STI fulfills this role in Africa depends on the ability of national institutions to undertake research to spur innovations to address national development challenges. However, success in research depends on the availability, state, and condition of research facilities, tools, and services (collectively referred to as research infrastructures) and trained and competent researchers to undertake research.

Research infrastructures come in many shapes. Some are large like the Square Kilometre Array (SKA) others are small like some national laboratories. African countries have invested in RI but evidence suggests a glaring deficit in most countries. This deficit, if not addressed expeditiously, will constrain/fetter the ability of countries of the continent to deploy STI as a means of implementation of the SDGs with an adverse knock-on effect on the rate of progress to achieve the targets. Cooperation among countries of the region and between the continent and the international community could help build RI capacity.

This meeting/analytical report describes RI landscape in Africa and explores how cooperation and collaboration can help to attenuate the constraints of capacity to enable African countries to undertake the research critical for spurring innovations to achieve the SDGs as well as realize the aspirations of the African Union's Agenda 2063.

I. **Background**:

African countries, in spite of recent improvements in economic performance and related social indicators, continues to struggle with diseases, poverty, and other development challenges most of which are can be solved or attenuated through science, technology and innovation. While appreciable progress has been made in the aggregate in building up the research and innovation capacity of the continent to confront these challenges, much remains to be done. Research capacity varies across countries and a much faster rate of progress can be achieved if African countries had high quality higher educational and research institutions and complementary high quality research facilities, tools, and services, collectively referred to as research infrastructures, needed by researchers to function effectively.

The concept of research infrastructures is not new although in recent times it has been championed by the European Union in the context of the European research area network. Back in 2003, with specific reference to science and engineering, the United States National Science Board[1] defined research infrastructure as "tools, services, and installations that are needed for the science and engineering (S&E) research community to function and for researchers to do their work"[2]. The European Strategy Forum for Research Infrastructures (ESFRI) defines research infrastructures as "facilities, resources, and services that are used by the research communities to conduct research and foster innovation in their fields" [3].

Common to both definitions is that RI decomposed, includes: major scientific equipment (or sets of instruments, instrumentation, platforms and facilities), software or knowledge-based resources such as libraries, databases, collections, archives and scientific data, e-infrastructures … and any other tools that are essential to achieve excellence in research and innovation. They also include the technical support (human or automated) and services needed to operate the infrastructure and keep it working effectively, and the special environments and installations (such as buildings and research space) necessary to effectively create, deploy, access, and use the research tools. Research infrastructures may be single-sited", "virtual" and "distributed".

RIs thus encompass a wide range and variety of facilities, tools, resources and services that enable researchers in public and private institutions to achieve excellence in research and innovation. As such, research infrastructures constitute the bedrock and foundation of vibrant research, technology and innovation communities. They are critical in knowledge production, acquisition, adaptation, diffusion and commercialization.

Good RIs is needed by research universities to train top-notch professionals in almost all areas – be they in agriculture, health, engineering or water among others. The absence of African universities in the top 100 in the world or the presence of about 26 universities in the top 1000 universities is largely due to limited RI which in turn influence the research and teaching environment and performance on which the rankings are based[4]. In particular, RI affects

[1] National Science Board (NSB) 2003. Science and Engineering Infrastructure for the 21st Century: The Role of the National Science Foundation. NSB 02-190 available at https://www.nsf.gov/nsb/documents/2002/nsb02190/nsb02190.pdf

[2] https://www.nsf.gov/nsb/documents/2002/nsb02190/nsb02190.pdf

[3] European Commission (2016) European Charter for Access to Research Infrastructures: Principles and Guidelines for Access and Related Services.

[4] https://www.timeshighereducation.com/world-university-rankings/2017

training especially at Masters, PhD and Post-Doctoral levels in technologically demanding and new emerging fields (e.g. artificial intelligence, nanotechnology, biosciences, etc).

Secondly, RI is needed to undertake cutting-edge research that end up in peer-reviewed articles, knowledge that is the subject of patent applications and grants, and its transformation into products and processes. Third, RI is also needed to drive innovation and service delivery through stronger collaboration with the private sectors and support to science/technology parks, business incubators and field stations. Institutions with world class research facilities are likely to serve as service providers to industry and the public sector. This in turn helps industry to inform the R&D agenda of such institutions.

Finally, soft research infrastructure, such as fast, secure and reliable networks and information technology, enable researchers to access management, intellectual assets and other resources as well as in accessing key information on sources of knowledge, market opportunities and potential partners within the nation and across national borders. In addition to IT facilities, up-to-date libraries, field testing stations, technology transfer offices, business development centres, meeting and conference facilities collectively support and enable R&D institutions to stay at the top of their game.

II. Cooperation/collaboration to enhance research infrastructure capacity in Africa

As noted earlier, most African countries have inadequate RI. The inadequacy in some sense reflects the ad hoc nature of planning for research infrastructures in most countries. Seldom are infrastructures built with the whole sector, country or region in mind. And very little effort is put into maintaining and sustaining the infrastructure once acquired. This state of affairs hampers the ability of researchers to undertake research to provide solutions to many of the challenges that limit or fetter their development and ability to meet continentally and internationally agreed development goals. Regional and international collaboration could help to attenuate the constraint conditional on the availability (domestically) of skills.

This is in line with the United Nations 2030 Agenda for Sustainable Development – Transforming our world. Goal 2 Target 2.a calls for "*Increase[d] investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries*". Goal 17 target 6 calls for ways to "*Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing".* These stipulations in Agenda 2030 are based on the general understanding that in a globalized world, no country working in isolation can mobilize the science, technology and innovation capacity it needs to address all its challenges as well as global challenges such as health, security, conservation, environment and climate change.

African countries have explored and continue to explore regional and international cooperation as an additional instrument to bridge research infrastructures deficit. For example, one of the conclusions of the 2012 CAAST-Net-PAERIP stakeholder conference was that "research infrastructures should be a priority focus of bi-regional Africa-EU cooperation in science,

technology and innovation." South Africa's recently promulgated research infrastructure roadmap[5] envisages participation in "joint international research infrastructures."

While not systematic, African countries have used regional and international approaches to promote research collaboration and by implication attenuate national research infrastructures gaps. For instance, the control of locusts has been one area where African countries collaborate in research and in control and eradication of the pests. Examples include the International Red Locust Control Organisation for Central and Southern Africa (Zambia) and the Desert Locust Control Organization of Eastern Africa (DLCO-EA) in Ethiopia. The DLCO-EA founded in 1962, has its own aircrafts and research facilities in order to meet its mandate for the control of migratory pests, pesticides, information and knowledge management, forecasting of upsurges of the migrant pests etc. The networks of the International Livestock Research Institutes, International Institute for Tropical Agriculture, CDC labs etc contribute to this effort.

III. Objectives of the EGM

The overall objective of the Expert Group Meeting is to identify strengths and weaknesses of the RI landscape in Africa and to explore the scope for collaboration/cooperation to bridge the RI deficit as a critical success factor if STI is to fulfil its role as a means of implementation of the SDGs. Specifically, the EGM will

1. Give an overview of the RI landscape in Africa;
2. Enable a better understanding of the RI challenges in Africa and the magnitude of the constraint that they present to enhancing the role of STI in achieving the SDGs;
3. Explore the innovation and socio-economic impacts of research infrastructures and their measurement in the context of Africa?
4. Identify the possibilities of regional integration in building RI capacity in African countries;
5. Explore the global dimensions of RI and the role international cooperation can play in bridging Africa's RI deficits. .
6. Provide policy recommendations for the leveraging of international cooperation / collaboration to develop Africa's RI capacity in order to achieve the SDGs.

IV. Expected outcomes

The expected results include, amongst others, the following:

- Research and analytical report on "research infrastructure in Africa and the role of collaboration to meet the SDGs";
- Policy briefs and working papers;
- An input into report to the next meeting of the ECA Conference of Ministers of Finance, Planning and Economic Development

V. Expected impact

The expected impacts are a) enhanced understanding on how Africa can harness collaborative arrangements to build STI capacity and RI capacity in particular and b) improved national policies on research infrastructures..

VI. Partnerships

[5] http://www.gov.za/sites/www.gov.za/files/sa%20research%20infrastructure%20road%20mapa.pdf

The EGM will be organized in collaboration with the Department of Human Resources, Science and Technology of the African Union Commission and the NEPAD Planning and Coordination Agency.

VII. Participation

Participation is by invitation only. Invitations will be extended to African Ministries responsible for Science, Technology and Innovation and Ministries responsible for National Development Planning to nominate senior policy experts to attend. Invitations will also be extended to heads of STI institutions, AU departments, NEPADS, regional economic communities, selected academics institutions, UN agencies with pertinent mandate, multi-lateral and bilateral development agencies; and NGOs/CSOs as well as a selected number of experts. ECA will provide full sponsorship to about 20 experts from African countries.

VIII. Documentation and language

Documents, materials and publications relevant to theme will be made available on the website created for the meeting. Expert papers will be made available in the language in which they are written. The working language of the meeting shall be English

IX. Date and venue

The EGM will be held on **4 and 5 October, 2017** at the United Nations Conference Centre, Addis Ababa, Ethiopia.

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