BUILDING SCIENTIFIC CAPACITY AND EXPANDING RESEARCH OPPORTUNITIES THROUGH REGIONAL LINKAGES IN AFRICA: THE FEDERAL GOVERNMENT OF NIGERIA PERSPECTIVE

PRESENTED AT A
WORKSHOP ON DEVELOPING A NEW PROGRAM TO SUPPORT REGIONAL NETWORKS FOR SCIENTIFIC RESEARCH AND TRAINING IN SUB-SAHARA AFRICA.

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Introduction

"*In the world of the 21st century, critical issues related to Science and Technology confront every nation…Today, no nation that wants to shape informed policies and take effective action on such issues can be without its own independent capacity in Science and Technology (S&T)" – Kofi Anan (2004)*

INTRODUCTION CONT'D

- **Capacity Building**

- A long-term investment in individuals and institutions by societies to develop the knowledge, skills, and resources for meeting their developmental needs.

- It entails the development of scientific tools, education, and training and the application of Science and Technology (S&T) to decisions and actions.

- The developed nations have clearly demonstrated that one of the most potent means of achieving economic growth is through effective building of capability in Research and Development (R&D).

INTRODUCTION CONT'D

- Research has emerged to occupy the center stage in the activities of developed nations. Building research capacities in developing countries is, therefore, critical for the nations' long-term economic development.
- Tertiary Education and Research Institutions (RIs) as a vital element of a National Innovation System (NIS), have a central role to play in the build-up of capabilities for R&D in any nation.
- There is ample evidence that R&D generated by these institutions have contributed immensely to the rise and expansion of the world knowledge.

R&D Infrastructures in Nigeria

- The Universities and RIs in Nigeria have the primary mandate to build capacity (training) and carry out researches while the RIs conduct research with a view to solving specific problems in the society.

- Many of these RIs have undertaken a number of successful R&D with tremendous impact on the technological development of the nation.

- Only a few of these successfully developed R&D products have been adopted and commercialized.

Universities	89
Polytechnics	about 70
Colleges of Education	> 60
Research Institutes	140

Nigeria's Potential Human Resources for R&D

- There are about 5000 employees in the Federal Ministry of S&T and its Agencies including about 1% PhD holders.
- Academic staff in public universities are about 10,000 but less than 50% are PhD holders. Several others operate in the private institutions
- There are estimated 5 million Nigerian polytechnics/university graduates
- Several thousands Nigerians in Diaspora with expertise in various fields of S&T
- Database of experts in S&T is now being developed to capture both home-based and those in Diaspora

Challenges of Research Capacity Building in Nigeria

Despite the seemingly large R&D infrastructures, Nigeria still faces many challenges in the conduct of research and training of researchers.

Some of these challenges are:

- Poor or Inadequate Infrastructure
- Lack of Funding
- Lack of Enabling Environment
- Brain Drain

Challenges of Research and Capacity Building cont'd

- **Poor or Inadequate Infrastructure:**

- General lack of facilities to carry out researches
- Obsolete research equipments which often retard the effort to fulfil the mandates of R&D in institutions
- Many Institutions' libraries are stocked with old volumes of books/journals and often with limited access to online resources
- Unsteady/ inadequate supply of electricity and water

Challenges of Research and Capacity Building cont'd

Lack of Funding

- Scarce resources resulting in competition between R&D and other government needs: potable water, food or basic health care
- Limited funding for expendable items or basic laboratory equipment

Lack of Enabling Environment:

- Limited access to collaborations with international counterparts and RIs
- Scarce Opportunities to attend international conferences and workshops;
- Incessant strikes by Trade Unions in public institutions

Challenges of Research and Capacity Building cont'd

- **Brain Drain:**

Fundamental problem to all areas especially research in STI and socio economic spheres of Africa.

- About 127,000 highly qualified African professionals left the continent between 1960 and 1989 (ECA)
- Africa losses 20, 000 professionals on a yearly basis. International Organization for Migration (IOM)
- Africa's share of global scientific output has fallen from 0.5% in the mid -1980's to 0.3% in the mid -1990's.
- Nigerians in Diaspora are estimated at between 17-20 million, a significant fraction of these are professionals
- There are about 5,000 Nigeria medical doctors practising in North America
- This continuous outflow of skilled labour contributes to a widening gap in S&T between Africa and other continents.
- The UN recognises that "emigration of African professionals to the West is one of the greatest obstacles to Africa's development"

Government Efforts towards Addressing R&D Challenges

The Federal government has put in place some programmes targeted at addressing the aforementioned challenges and these include:

- **Reform of Science, Technology and Innovation (ST&I) System in Nigeria:**
  - The reform focuses on restructuring of the S&T infrastructure and developing a plan of action for ST&I
  - A key outcome of the on going reform is the introduction of the Peer Review Mechanism which focuses on Periodic Performance Evaluation of S&T Research Agencies in FMST.
  - Another outcome is the streamlining of research agencies of the Federal Ministry of Science and Technology (FMST) to remove significant overlap in mandates and activities of these agencies.

Promotion of Commercialization of R&D Outputs

- Government is determined to exploit the successfully developed R&D results so as to enhance their production and marketability.
- Establishment of a 19-man Presidential Committee on Inventions and Innovations headed by the PS, FMST.
- To enhance the commercialization of R&D results, the HMST mandated RIs to float companies in collaboration with the private sector.
- It is hoped that this initiatives will further enlighten the general public and specifically attract the interest of private entrepreneurs who have been largely reluctant to venture or invest in such newly developed technologies

Examples of FMST Agencies with Commercializable R&D Products:

- National Agency for Science and Engineering Infrastructure (NASENI: science kits for primary and junior secondary students),
- National Research Institute for Chemical Technology (NARICT: industrial chemicals & leather football),
- Nigerian Building and Road Research Institute (NBRRI: interlocking blocks machines for low-cost housing),
- National Space Research and Development Agency (NASRDA: bandwidth for communication and satellite imageries) and
- Sheda Science and Technology Complex (SHESTCO: NICOSAN for the management of Sickle cell anaemia).

Government Initiatives to Support R&D Funding

Some initiatives of the Federal Government to address the issue of funding of R&D are:

- Education Trust Fund:2% of Higher Education Tax on company profits used to provide R&D facilities: physical infrastructure, equipment and human capability development;
- Petroleum Technology Development Fund (PTDF) : Makes funds available for scholarships in postgraduate research programmes in the oil and gas sector;
- Endowment Fund: US$5 billion for the National Science Foundation (NSF) will soon be established

Addressing the Brain Drain Challenge

- Government initiated actions to turn "brain drain" to "brain gain" by inaugurating the Nigerian Diaspora day- a day in July of every year.
- This forum aims at facilitating active participation of Nigerians in Diaspora in the developmental process.
- The first Nigerian Diaspora day took place in July 2006 concurrent with the Diaspora 2nd science and technology conference

- NETWORKING IN R&D IN S&T

Existing Facilities for Regional Network

Examples of facilities in Africa for collaborative R&D include:

- African Laser Centre (ALC), Laser Technology in South Africa
- African Research Center (WARC) in Senegal (Capacity Building)
- African Regional Center For Engineering Design and Manufacturing (ARCEDEM) in Ibadan, Nigeria
- Regional Centre for Training in Aerospace Surveys (RECTAS), Ile-Ife, Nigeria
- African Institute for Higher Technical Training and Research (AITHTTR), Nairobi, Kenya

Potential R&D Facilities in Nigeria for Regional Networking

The FGN has adopted the centre of excellence model by building state-of –the-art research infrastructures in specific locations all over the country for cross-disciplinary research purposes.

Examples are:

- Sheda Science and Technology Complex (SHESTCO), Abuja (Advanced physics/chemistry labs, 1MV Gamma (Food) Irradiator),
- Centre for Energy Research and Training (CERT) in ABU, Zaria (Nuclear Reactor),
- Centre for Energy Research and Development (CERD) in OAU, Ile-Ife (High Energy Ion Accelerator) and
- National Agency Science & Engineering Infrastructure (NASENI) Virtual Manufacturing Laboratory using CAD/CAM.
- Africa Institutes of Science and Technology (AIST), Abuja (world-class institution for Capacity Building in S&T).

Linkage with NEPAD Consolidated Plan of Action

There is an on going coordinated effort by African leaders to provide direction for research in the areas of S&T as spelt out in the Africa's S&T Consolidated Plan of Action of the AU Commission under NEPAD initiative.

Some of the programmes and projects under the plan of action include:

- Improving infrastructure or facilities for R&D and promoting sharing of such facilities;
- Creating institutional and policy arrangements that enable African countries to mobilize and share their scarce resources to conduct science research and generate technological innovations;
- Strengthening the continent's human skills base by increasing the number of scientists, technicians and engineers;
- Improving the quality and intensity of regional cooperation;
- Building a strong political and civil society constituency for S&T in Africa.

Expanding Research Opportunities

To promote and expand R&D through regional linkages in Africa, there is need to increase research opportunities by significantly expanding research funding and involvement of graduates and lecturers in research and scholarship through the following strategies:

- Support cross-university interdisciplinary research initiatives in the already outlined developmental key focus areas as spelt out in the NEPAD and AMCOST initiative: ICT, biotechnology and biodiversity, energy water and desertification, material sciences, nanotechnology and nanoscience
- Expand and promote targeted research areas (already identified above) that support economic development
- Engage in continuous assessment and improvement of policies, procedures, practices and services that promote research activities
- Expand use of advisory groups that include representative stakeholders to monitor progress of research support and to provide input on stakeholder satisfaction
- Provide training on regulatory affairs and research ethics to undergraduate and graduate students interested in research

Closing Remarks/Recommendation

- Leaders of Government in Africa need to be constantly reminded of the strategic roles of R&D in S&T for sustainable development
- Leaders of thought in the continent in S&T matters need to create/identify regional champions that will coordinate activities in specific areas of interest within the sub region in accordance with the Africa's S&T Consolidated Plan of Action.
- FGN recognises the importance of networking and collaboration; hence the reason for embracing development of R&D facilities for Networking.
- Genuine partnerships and collaborations among key stakeholders in the sub region is necessary to make sure that the overall S&T effort matches the domestic, regional and global challenges.

THANK YOU