Enhancing SSA’s STI Capacity to Harness Resources of Nature: The Vision of the Nelson Mandela African Institute of Science and Technology (NM-AIST)

By Burton LM Mwamila
African leaders (incl. Nelson Mandela) discussion with Jim Wolfensohn (then WB President), 2000/01.

Nelson Mandela greatly concerned by the knowledge gap (knowledge deficit) in SSA suggested to Jim that Institutes of S&T are perhaps Africa’s single greatest need (the likes of IITs & IISs in India).

Frannie Leautier, then Vice President of WBI, was given the task of making this happen.

Hippolyte Fofack, an African WBI official, was charged with developing the concept in collaboration with some Africans in the Diaspora.
Situation Analysis
Africa’s Endowment is not properly nor adequately harnessed for the benefit of the continent!!
• The Greatest endowment any national can have is human capital.
• **Human Capital** with knowledge & skills (value-added Human Capital) is the key to development!

• **Availability of other natural resources in itself is not as necessary and by no means a sufficient condition for Socio-economic development!**
Extent of Value addition to Human Capital, the World over

Source: www.worldmapper.org
Science & Technology Performance – a function of Value-addition to Human Capital

“...in the final analysis it is basically the mystery and utilization of modern science and technology which distinguishes the South from the North”. Abdus Salam African Nobel Laurete, 1979
Objectives of the AISTs

- To provide the best facilities for graduate and post-doc studies and research
- To bridge between research and industrial development
- To catalyze the development of world class science and technology in Africa
- Strong link with industry for technology transfer
- Technology parks with incubators and innovation centres for spin-offs
The Nelson Mandela African Institute of Science & Technology (NM-AIST)
NM-AIST’s Campuses
- Tengeru & Karangai

Tengeru Campus

DED-Meru

DED-Arusha

Karangai Campus
From CAMARTEC to NM-AIST

199 Acres
NM-AIST

Is for research intensive graduate and post-doc training in SET, viz. a Research University.

Its vision is to become a world-class institution dedicated to the pursuit and promotion of excellence in SET, and their applications for economic growth and sustainable development.

Maintains strong national and regional ownership.
To deliver and promote high quality and internationally competitive teaching and learning, research and innovation, and public service in SET for enhanced value addition to people and natural resources, emphasizing entrepreneurship.
To stimulate, catalyze and promote intensification of agricultural production, value addition to natural products, and human & animal health.

To promote & harness linkage to society and the local industry, and scientific and technological response to local needs (thereby avoiding the traditional social divide between academia and industry).

To strive for a combination of strong local and global connections.

The Motto: ACADEMIA FOR SOCIETY AND INDUSTRY
Key Deliverables

Production of:

- Top-notch SET academics for higher learning institutions;
- Competent researchers for R&D institutions;
- Techno-prenuers, industry captains, innovation managers for stimulating, catalyzing and promoting business start-ups and the growth of the local industry.

Establishment of a world-class environment for the generation and application knowledge (through research, innovation and technology development) for wealth creation and sustainable development.
How NM-AIST hopes to contribute to changing the situation
Life Sciences and Bioengineering (LSBE)

- Biological Engineering
- Sustainable Agriculture, Plant and Animal Biotech
- Health and Medical Biosciences
- Food Science & Industrial Biotechnology
- Biodiversity Conservation & Management
Mathematics, Computational & Communication Science & Engineering (MCCSE)
Water & Environmental Science & Engineering (WESE)

Hydrology and Water Resources Engineering (HWRE)

Environmental Science

Environmental Science and Engineering (EnSE)

Hydrology and Climate Change

Biological & Irrigation Engineering

Environmental Engineering
Materials Science and Engineering (MaSE)

- Bio & Polymeric Materials
- Ceramic Materials
- Metallic Materials
- Electronic Materials
- Smart Materials
Sustainable Energy Science and Engineering (SESE)

Sustainable Energy Generation and Utilization

Bio Energy and Renewables

Nuclear Power Engineering and Technology
Business Studies and Humanities (BuSH)

Enterprise Development & Management

- Management & Entrepreneurship
- Innovation Management
- Innovation Systems & Clusters
- IPR & Patent Management

Communication Skills & Research Methodology

Philosophy, Law & Ethics
Concentration of Talents:

*Students, Faculty, Researchers & Staff*

Concentration of Resources:

*Govt & Private sector support, Multi & Bi-lateral donors, Philanthropists, Endowment*

Enabling Environment:

*Strategic & Visionary Leadership, Institutional Autonomy, Conducive Academic & Research Infrastructure*
Staffing and Students

Core permanent and contract faculty recruited competitively from within and outside EA Region

Pool of visiting faculty from the Diaspora (coordinated by ARIST) and other collaborating institutions

Students to be admitted competitively from the EA Region, and SSA generally.
## 10 Yrs Projected Total Annual Student Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Tengeru Campus</th>
<th>Tengeru &amp; Karangai</th>
<th>Faculty Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Master’s</td>
<td>60</td>
<td>140</td>
<td>180</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>30</td>
<td>70</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>210</td>
<td>300</td>
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<tr>
<td></td>
<td>-</td>
<td>34</td>
<td>48</td>
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<td>4</td>
<td>6</td>
</tr>
<tr>
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<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

**Key:** .... Resident; ..... Visiting; .... Post-docs
Capital development funds from:
- Government of Tanzania – already committed approx. USD 60 mills
- Multilateral and bilateral sources in form of grants/soft loans

Operational funds from student fees

Research grants, sought through winning proposals, from philanthropists & others

An Endowment Fund for Excellence – PPP sought

SET Graduate Student Fellowship Fund

Buy-in contributions by countries in the catchment area
The Infrastructure for Teaching & Learning, and Research & Innovation
Admin / Academic Complex - 1st Floor

1 Video Conferencing Rooms
2 Lecture Rooms
Laboratory Complex ~ 5,000 m²

Lab 1  Environmental & Water Quality
Lab 2  Materials Science and Engineering
Lab 3  Molecular-/Micro-Biology & Bio-Engineering
Lab 4  Bio-Safety
Lab 5  Bio-informatics
Lab 6  Maths, Computational & Communication S & E
Lab 7  Energy Utilization & Conversion
Lab 8  General ICT & Telecomms Systems Eng.
Human capital – Recruitment in progress, ~ 80 already reported.

Equipment – Delivery and installation in progress

Establishment of collaboration with various world-class universities abroad – Partnerships with USA, Korean, Canadian, European and Indian institutions established.

Operational Policies and Procedures (OPPs) – Some draft documents in place.

Curriculum Development – Master’s and PhD curricular developed for six programme areas.

Resource Mobilization
– Indian Govt granted USD 1.3 mill for ICT Resource Centre
– Proposals submitted to WB, AfDB, ACBF, etc
Stimulating and Catalyzing the Development of the Local Industry
Possible Start-up Technology Park at the Tengeru Campus

199 Acres
MEETING THE DEMAND FOR
MORE PhDs, POST-DOCS & VISITING RESEARCHERS
PROPOSED CONSTRUCTION OF PHD STUDENT'S HOSTEL FOR NELSON MANDELA UNIVERSITY
Arusha City as an EA Hub
Tanzania is one of the world’s bio-diversity hot-spots

Arusha is HQ of EAC and well placed midway between Cairo and Cape Town

Fast growing city, stable and peaceful with excellent climate

Vibrant Tourist Industry within range of Serengeti, etc.

Easy International Access through KIA

Experience with hosting international programmes: ESAMI, ICTR, PAPU

• Nicknamed the Geneva of Africa by Bill Clinton
• NM-AIST & AKU promoting Arusha into an EA Education Hub
• Why shouldn’t Arusha be the Brussels of E, C & Southern Africa!!!
Admin-cum-Academic Complex

Before August 10, 2010
Hostels for PhD Students, Post-docs

Before August 10, 2010
Thank you very much!
Asanteni sana!