World Bank Observations on Building STI Capacity For Development

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Plan of Presentation

• What is STI Capacity?
• Observations from Government of Rwanda -- World Bank STI capacity building program
• World Bank Global Forum
• Conclusion
What STI Capacity?
Five Dimensions of STI Capacity

- National (and local) government capacity to formulate and implement coherent S&T programs and policies
- Enterprise capacity to utilize knowledge to innovate and produce higher value added, globally competitive goods and services
- Technologically and scientifically skilled workforce trained to work with modern equipment and production processes
- Import, adapt, and adopt knowledge produced outside the country
- Production of new knowledge via R&D
Capacity building is needed at all skill levels

<table>
<thead>
<tr>
<th>Skill Levels</th>
<th>Required Tasks</th>
<th>Required Skills</th>
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<tbody>
<tr>
<td>Basic Operators Skills and Capabilities</td>
<td>Hydrological Analysis of Surface and Underground Water</td>
<td>Hydrology, Geology, Limnology, Geochemistry, GIS and Remote Sensing</td>
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<td></td>
<td>Watershed Conservation and Pollution Control</td>
<td>Environmental Engineering, Chemistry, Soil Science, Geology</td>
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<td>Well Boring and Pumping Underground Water</td>
<td>groundwater engineering, Construction, Masonry, Pump operation, maintenance</td>
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<td></td>
<td>Harvesting Rainwater Run-offs from Roofs and Fields</td>
<td>Geology and Hydrology, Construction and Masonry</td>
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<td></td>
<td>Water Storage &amp; Distribution Infrastructure</td>
<td>Civil Engineering; Construction, masonry (for tanks, reservoirs, pipes)</td>
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<td></td>
<td>Water Purification and Water Quality Control</td>
<td>Chemistry, Microbiology, Public Health, Environmental Science, Laboratory Assistance</td>
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Getting the Balance Right is Important!
Observations from STI Capacity Building Program
Needs assessment and action plan – what does Rwanda have, what does Rwanda need, and how can Rwanda build capacity for:

- Appropriate Technology
- Food Processing
- Deliver clean water to rural villages
- Agriculture Productivity through Research and Extension
- Geosciences and Geothermal Energy
- Adding value to natural resources throughout value chain – importance of entrepreneurship

Hope to prepare a World Bank S&T project to finance the implementation of the recommendations in the Needs Assessments and Action Plans
Guiding Principles for STI Capacity Building Work in Rwanda

- Focusing on finding practical solutions to practical problems facing Rwanda in economic and social sectors
- Adopting a cross-sectoral approach that brings together many ministries and sectors
- Addressing all levels of technology and skills needs: from low-tech to high-tech, from vocational skills to sophisticated engineering skills.
- Looking for solutions in private sector for skills upgrading and technology development, not just in public sector
STI Capacity Building: Linking Silos…

- Higher Education and TVET
- Private Sector Development
- Research and Development (R&D)
- Standards and Quality Management
- Infrastructure Development
- Agriculture and Rural Development
STI needs assessment focuses on solving a problem (ex: food processing capacity building) and probes across multiple silos to identify capacity needs.
Cross-Cutting Nature of STI Capacity Building

**Education and Human Resource Development**
- Ministry of Education
- Ministry of S&T
- Ministry of Labor
- Ministry of Commerce
  - National University of Rwanda
  - Kigali Institute of S&T
  - Institute for Scientific and Technological Research

**Rural Development**
- Ministry of Agriculture
- Ministry of Labor
- Ministry of Infrastructure
  - Rural innovation Centers
  - Farmers Association

**Vocational and Technical Education and Training**
- Ministry of Education
- Ministry of Labor
- Ministry of Commerce
- Ministry of Infrastructure
  - Vocation schools
  - Technical School
  - Rwanda Private Sector Federation

**Packaging**
- Ministry of Infrastructure
- Ministry of Commerce
- Ministry of Agriculture
  - ISAR
  - Rwanda Environment Management Agency (REMA)
  - Rwanda Private Sector Fed.

**Private Sector Development**
- Ministry of Commerce
- Ministry of Education
- Ministry of Infrastructure
- Ministry of Finance
  - Kigali Institute of S&T
  - Rwanda IT Agency
  - Business Dev. Service
  - RIEPA

**Transport and Power**
- Ministry of Commerce
- Ministry of Education
- Ministry of Infrastructure
- Ministry of S&T
  - CITT(KIST)
  - Institute for Scientific and Technological Research

**On the Job Training**
- Ministry of Education
- Ministry of Labor
- Ministry of Commerce
- Ministry of Infrastructure
  - KIST, NUR
  - Vocation and Technical schools
  - Rwanda Private Sector Fed.

**Regulatory and Quality Management**
- Ministry of Commerce
- Ministry of Education
- Ministry of S&T
- Ministry of Agriculture
- Ministry of Sanitation & Environment
  - KIST
  - Rwanda Environment Mgmt Agency
  - Rwanda Bureau of Standards

**Building Capacity in Food Processing Industry**
Cross-Cutting Nature of STI Capacity Building

Education and Human Resource Development
(develop higher education, TVET, on-the-job training)

Infrastructure
(develop transportation for perishable goods; power for processing units and cold storage)

Agriculture and Rural Sector Development
(develop cottage industry for packaging material from fiber crops)

Standards and Quality Assurance
(develop capacity for testing, certification and compliance)

Private Sector and Industrial Development
(streamline informal food processing units)

Business Regulatory Environment
(improve ease of doing business, trade freedom, FDI incentives)
Removing Barriers vs. Building Capacity?

- **High Barriers**
  - High Capacity

- **Low Barriers**
  - High Capacity
  - Low Capacity

Source: Adapted from RAND Sub Saharan Africa
Determinants of Enterprise Innovation
Enterprise Model for STI Capacity Building: Options for Developing PPP’s

Entrepreneur
(Diaspora, FDI, Expat, Local, NGO)

- Uses and invests in well-trained manpower through:
  - On-the-job-training
  - Vocation schools
  - Technical Schools
  - Universities

- Strives for product and process innovation through:
  - Technology Searching
  - Reverse engineering
  - Buying and acquisition
  - Adapting

- Meets Standards and Quality through:
  - Engineering
  - Production techniques
  - Field and lab testing

Produces Saleable products and services

Market
(Local, Regional, Global)

Information from market research and from buyers
Global Forum on Building Science, Technology and Innovation Capacity for Sustainable Development and Poverty Reduction
Global Forum: Building STI Capacity for Sustainable Growth and Poverty Reduction

• Dates and Location:
  – Where: Washington, DC
Global Forum Participants

• Speakers
  – Thoughtful doers from government, industry, PPPs, NGOs
  – Presented STI capacity building case studies in which they were directly involved, to help participants:
    • Learn from lessons of experience – what did you do, how did you do it, what would you do differently?
    • Develop new and improved operational approaches for building STI capacity grounded in successful lessons of experience

• Participants
  – Government policy makers and program managers
  – Industry representatives
  – NGOs and Foundations addressing STI capacity building needs
  – Bank and Donor staff
Global Forum: Clusters of Issues

- Reducing poverty and achieving the MDGs: the role of STI capacity building
- Adding value to natural resource industries through STI capacity building
- Latecomer strategies for catching up -- linkage, leverage, learning, and STI capacity building
- The role of R&D in the development process
There is No Choice: “The world is moving fast…with or without you!”

Countries must develop the capacity to run faster
Because sometimes, falling behind is not a viable option
THANK YOU

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