

UNESCO Scotland
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Engineering Capability in Rwanda

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United Nations
Educational, Scientific and
Cultural Organization

United Kingdom
National Commission for UNESCO



SISTech

Presentation

- Context of the Work
- Role of Engineering in International Development
- Methodology of SISTech UNESCO Scotland Project in Rwanda
- Results
- Taking Findings Forward

Engineering Capability in Rwanda

- The Project Team
 - Suzy Goodsir (SISTech - Project Researcher)
 - Marielle Murray (SISTech - Project Manager)
 - Prof Paul Jowitt (SISTech / Heriot Watt University - Expert Input)
- Link to ICE and to IER
 - Request from Government of Rwanda
- Funding by UNESCO

Previous Work

- Royal Society of Edinburgh (RSE)
Technological Learning in Tanzania, with EAP
- Institution of Civil Engineers (ICE)
Presidential Commission Engineering without Frontiers
- 6th Brunel International Lecture
Engineering Civilisation from the Shadows
- DfID Development Awareness Fund
The Global Engineer, with EAP

Commission to look at role of engineers in meeting UN goals

A PRESIDENTIAL commission is to investigate the role civil engineers have to play in meeting UN international development goals on poverty, education, health and the environment.

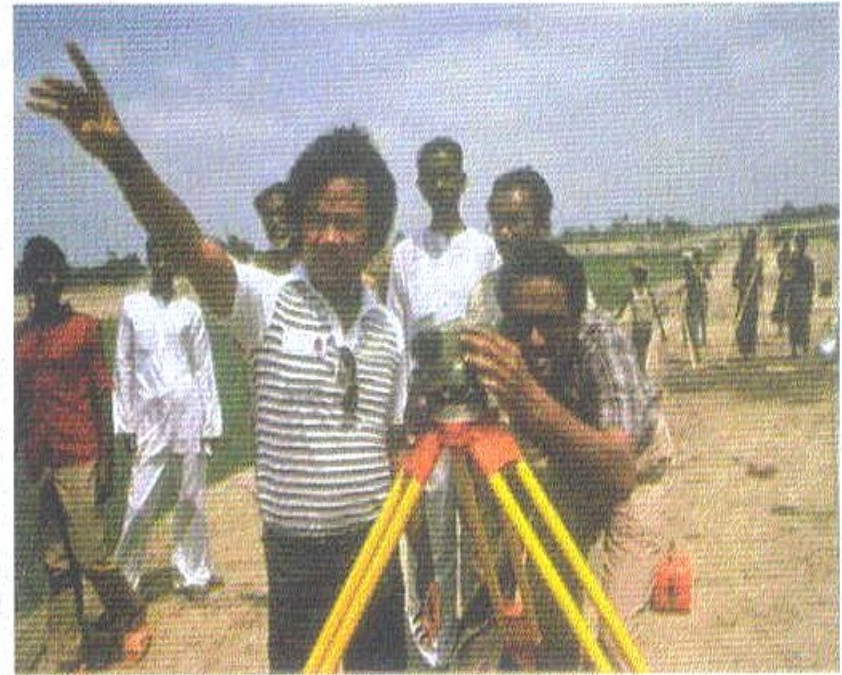
Paul Jowitt, professor of civil engineering systems at Heriot-Watt university, will lead the commission. It will ask what society expects of engineers, identify the critical activities needed to meet the UN's goals and suggest what the ICE should do to help meet them.

ICE President Doug Oakervee

announced the establishment of a working group to tackle these issues in his presidential address in November. But Council has agreed to upgrade the study to presidential commission status to reflect the importance of the work.

"What makes the scope of this study most challenging is the outward facing international dimension, and in particular, the inclusion of the 'north-south' aspect," said Jowitt.

"Meeting UN goals moves the agenda on to another plane, in



which the ICE and its members have to see themselves as having a lead role to play internationally as part of a valued and an important profession," he added.

Jowitt expects to spend \$27,500 on the study. Initial findings will be presented at the ICE annual conference, to be held in Cambridge in July.

“Poor infrastructure and inadequate infrastructure services are among the major factors that hinder Africa’s sustainable development. Without adequate infrastructure, African countries will not be able to harness the power of science and innovation to meet sustainable development objectives and be competitive in international markets.”

Professor Calestous Juma



Engineering Infrastructure and Development

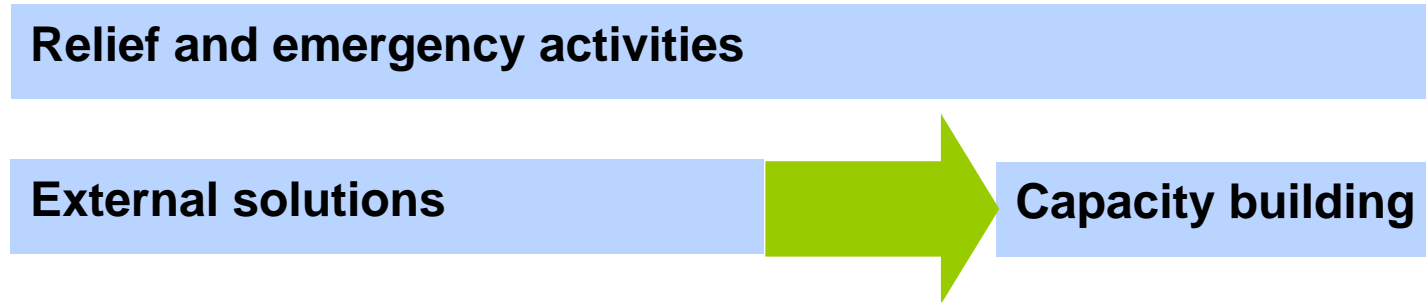
“The key to sustainable development in Africa is the creation of infrastructure.

Part of this is a purely physical matter: **a question of civil engineering.**

The business and finance communities in African nations identify the lack of good roads, railways, air and water transport facilities, energy and water supplies, and telecommunications networks as the main obstacles to economic growth.”

Sir David King

Changing Development Landscape



- Self-determination: to enable Global South to solve local problems
- To drive sustainable economic growth and appropriate technological innovation

The UN Millennium Development Goals

1. << Extreme Poverty
2. >> Primary Education
3. >> Gender Equality
4. << Child Mortality
5. >> Maternal Health
6. << HIV/AIDS
7. >> Environmental Sustainability
8. >> Develop Global Partnership



The Global Challenge...

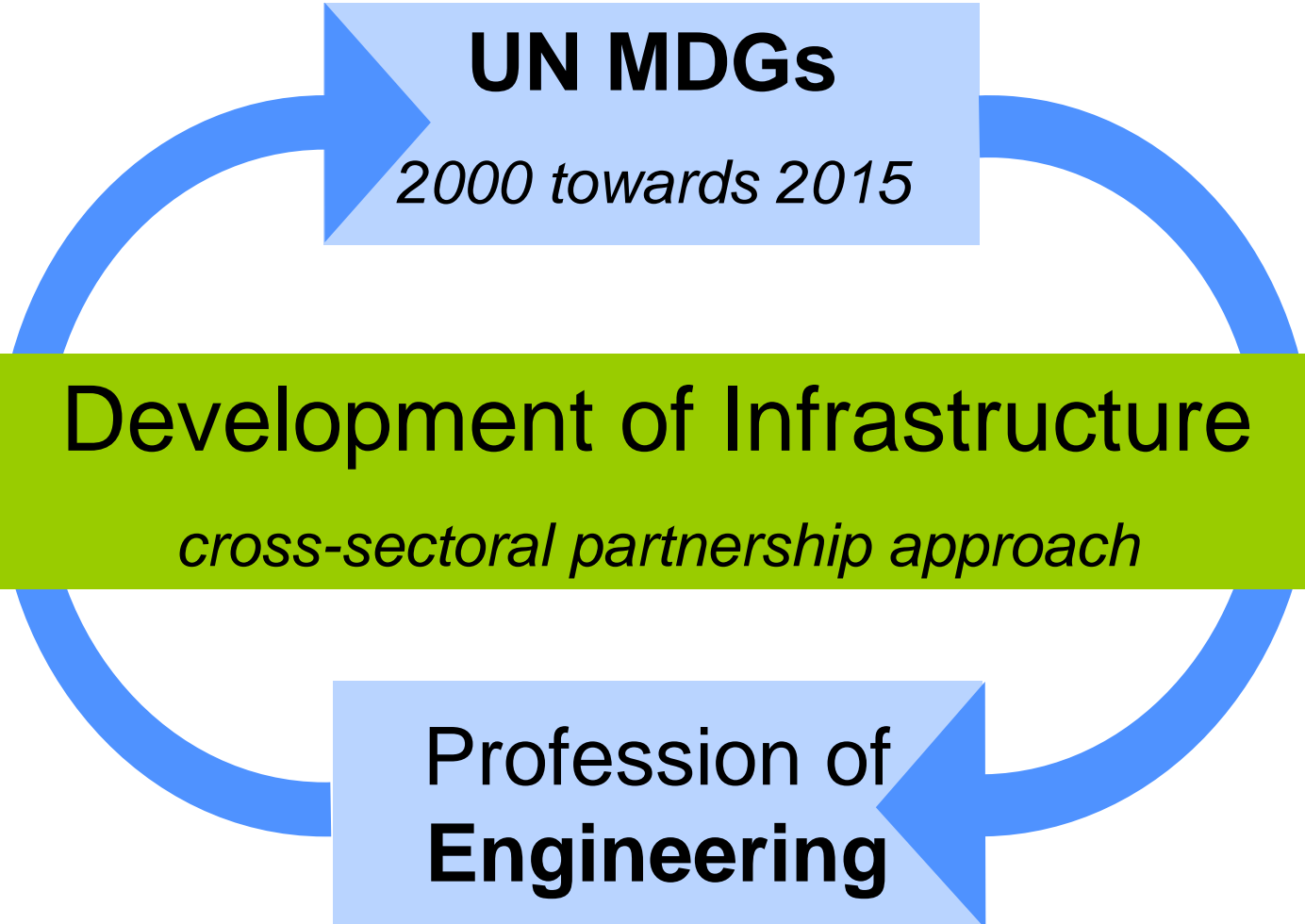
UN MDGs

2000 towards 2015

Development of Infrastructure

cross-sectoral partnership approach

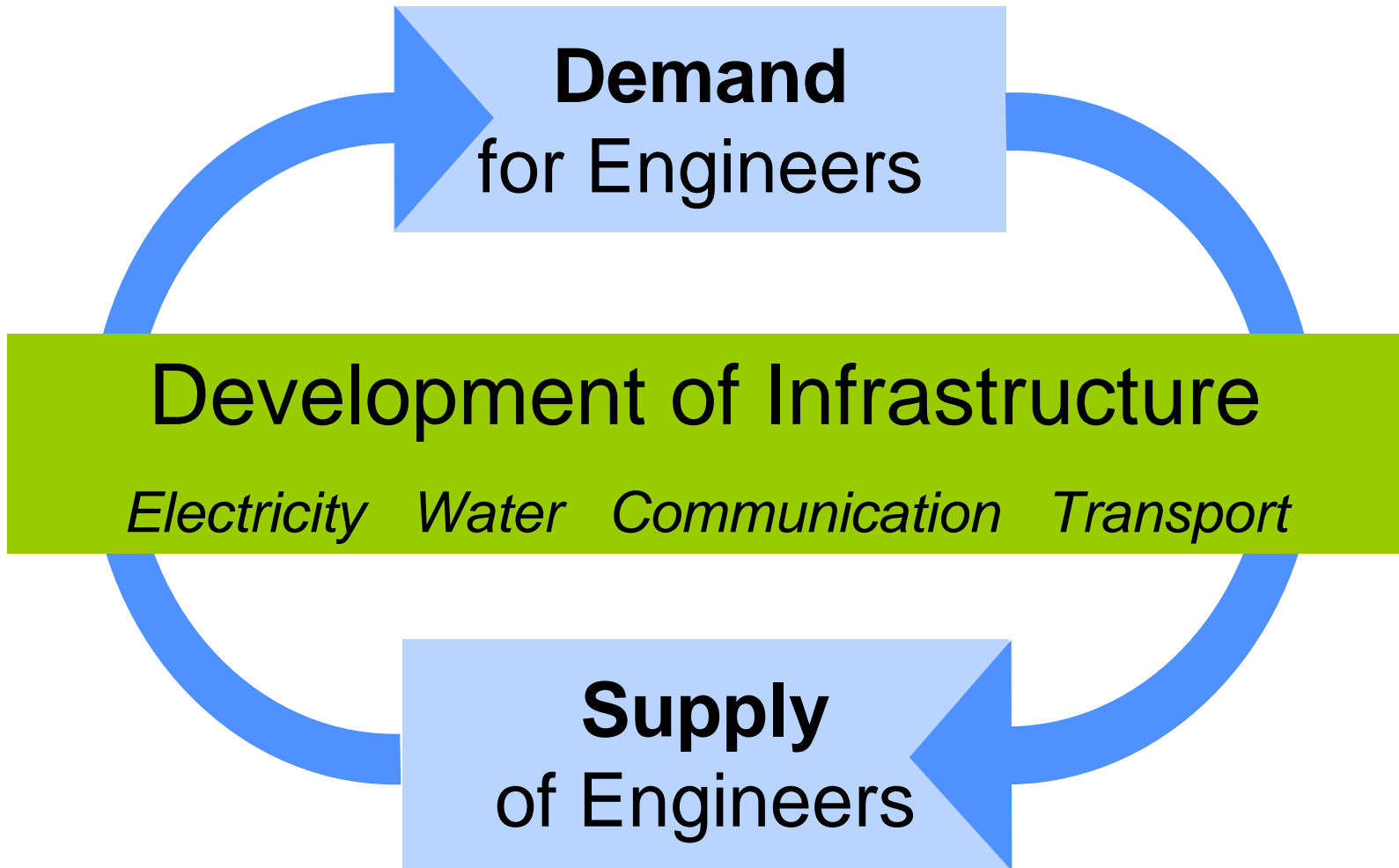
**Profession of
Engineering**



Finding Local Solutions



Project Methodology



Rwanda

Densely populated; subsistence agriculture

Few resources; exports coffee and tea; plans for knowledge-based economy

Population ~ 10 million; GDP per capita ~ \$272 (2007)



Challenges for development

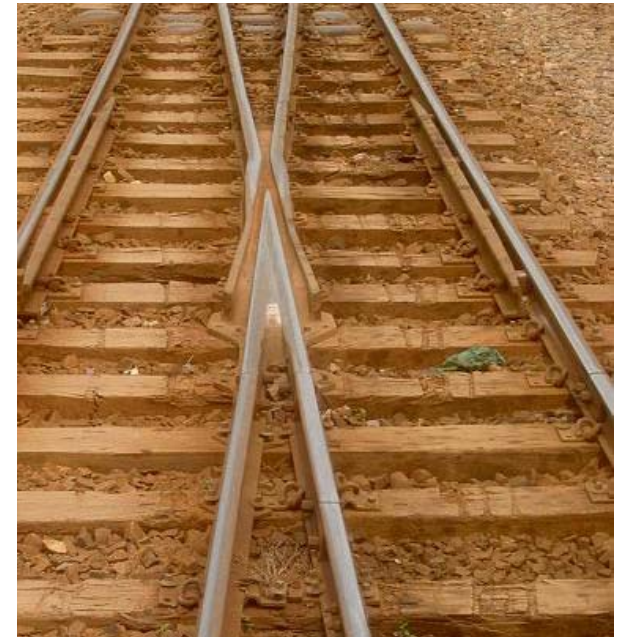
- Landlocked
- Historical lack of transport infrastructure
 - High transport costs an effective trade barrier
- Lack of electricity
- Environmental degradation
- Geographic and social inequality
 - Gini index of 47
- High levels of poverty...

Development goals

- *MDG*
 - Reduce the proportion of people in poverty: from 57% (2007) to 30% (2015)
- *Rwanda Vision 2020*
 - Increase road network by 10%
 - Access to electricity: increase from 4% to 35%
 - Access to safe water: from 64% to 100%
 - Urban population: from 17% to 30%

Infrastructure plans

- Lake Kivu methane harvesting (CounterGlobal, USA)
- New airport (TPS Consult, UK)
- Road projects (Strabag, Germany; Sogea, France; Gibb Africa, Kenya; CRBC, China)
- Railway Kigali to Isaka (DB International, Germany; Gibb Africa, Kenya)



Engineers – supply

- Two universities produce civil engineers
 - KIST ~30 per year
 - NUR ~50 per year
- Professional capacity lacking in public sector by 60%
- Construction suffers from ‘acute scarcity’ of professionals and artisans
- Rwanda lacks companies with capacity to undertake major projects

Engineers – skills gaps

- Student work placements often of poor quality
- Graduates
 - Technical skills are good
 - But lack project management, economics, report writing and data analysis
- Professionals
 - Some lack experience and training

Recommendations

- Higher education
 - Improve experiential learning
 - Allow experienced professionals to teach in universities
- In-service training / CPD
 - Online knowledge transfer
 - Conferences etc
- Harness intellectual diaspora?
- Academic knowledge exchange

What next?

- Who might use this information
 - The new IER
 - The Government of Rwanda
 - UNESCO Rwanda
 - ICE initiatives to support the IER...