

Capacity Building in Water Infrastructure Development and Maintenance in Africa A Robust Response to Covid-19 and Beyond

Prof.Dr.Eng. Innocent Nhapi

World Federation of Engineering Organisations (WFEO)

ENGINEERING SOLUTIONS FOR WATER ADAPTATION - UN STI Forum Side Event

Thursday, May 4, 2023

Time – 2.30 – 3.45pm CEST (Online)



Convergence of Agenda 2063 and the SDGs

2015 African Union Vision

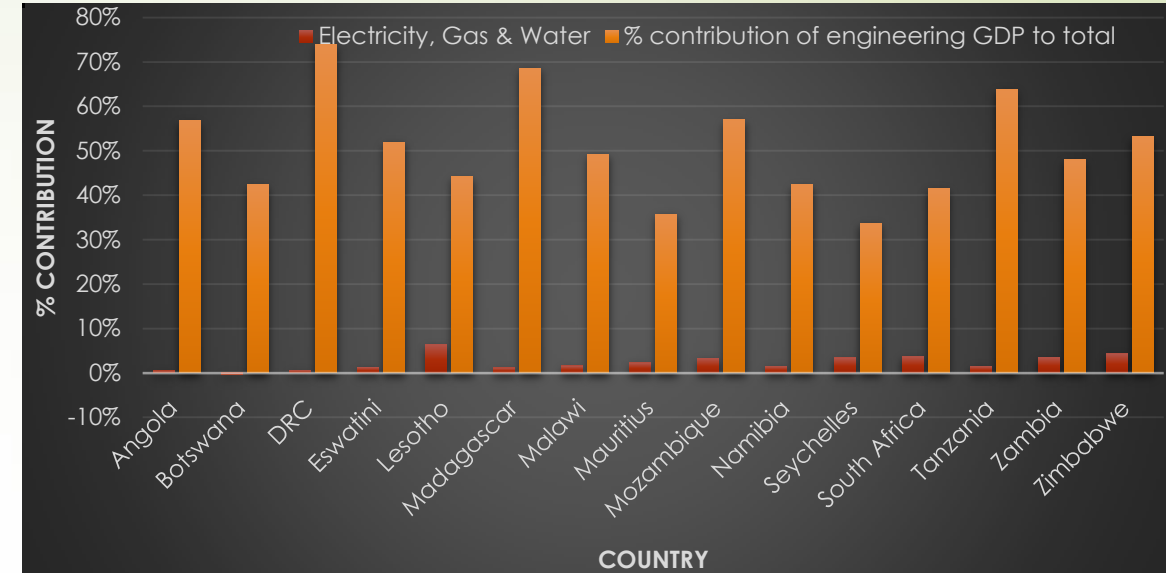
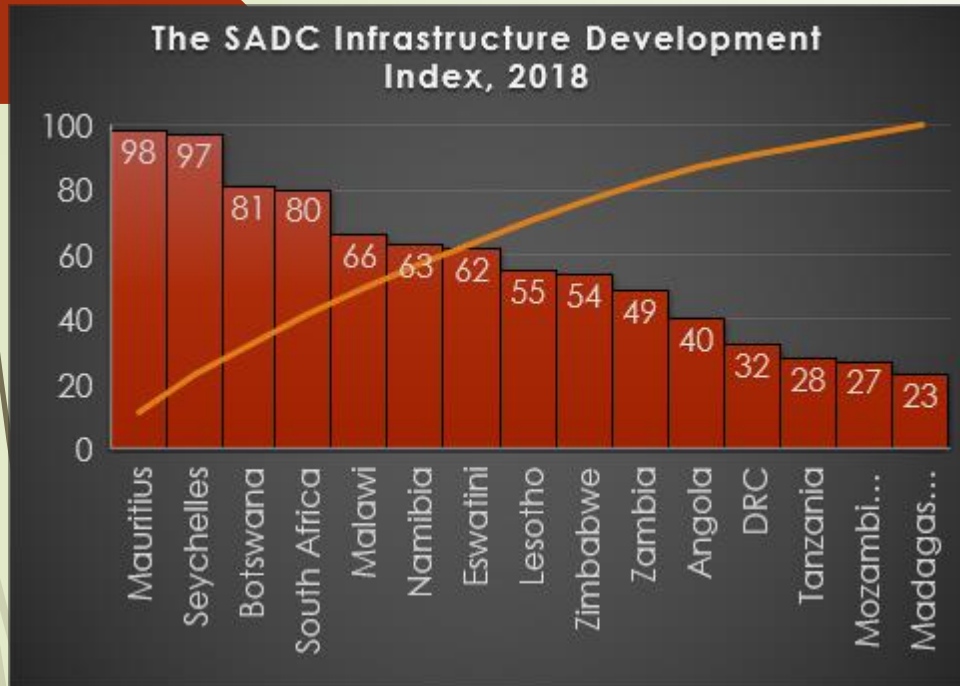
“An integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the international arena”

2015 SDGs

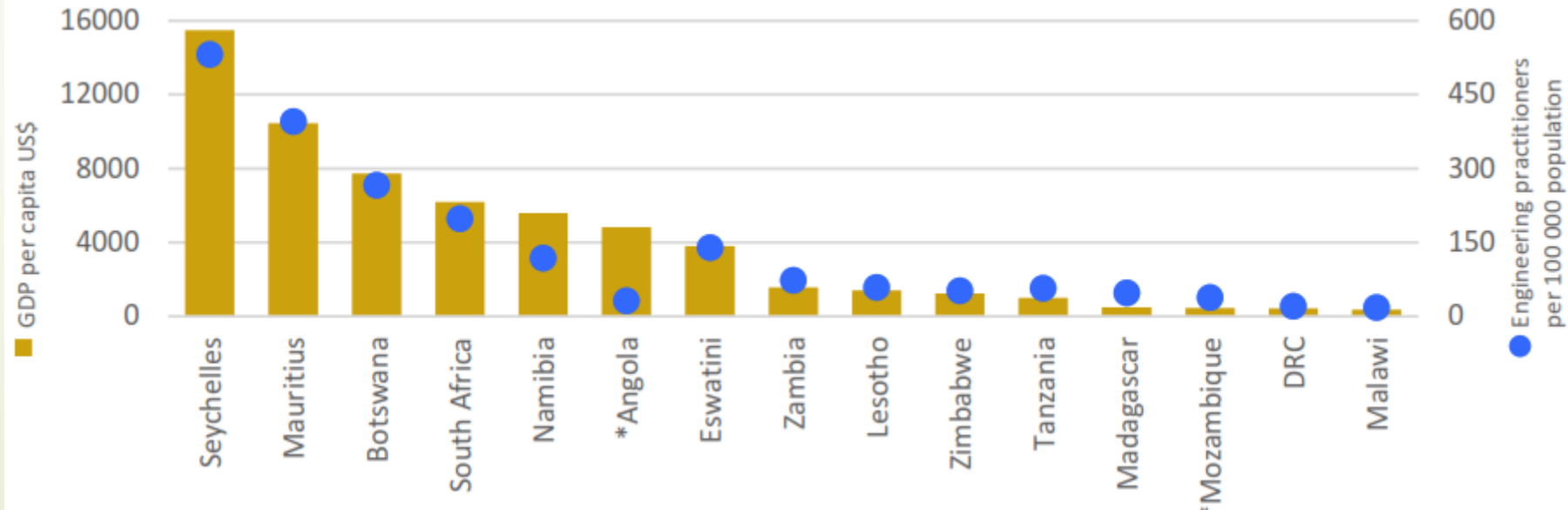
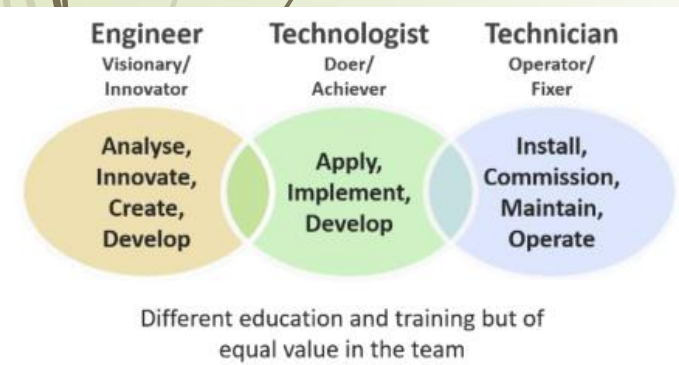
SDGs address poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanisation, environmental concerns and social justice.

	Agenda 2063 Goals	Priority Areas	SDGs
7.	Environmentally sustainable and climate resilient economies and communities	<ul style="list-style-type: none">• Bio-diversity, conservation and Sustainable natural resource management• Water security• Climate resilience and natural disasters preparedness	Goals no.6, 7, 13 and 15

Infrastructure Imperatives in Africa



We need to boost Engineering capacity in order to match infrastructural and industrial needs



Engineering Capacity in Africa

- SADC Industrialisation Strategy (2015–2063) recognised that many developmental goals cannot be achieved without developing economic infrastructure and **skills and capacities in STEM**.
- **Experienced engineering professionals**, rather than recent graduates, are required to conceptualise, motivate, plan, design and oversee the development of mega projects.
- Sub-Saharan Africa, infrastructure development lags significantly behind other developing regions.
- Royal Academy of Engineering 2012: ...Engineers graduating without necessary skills and experience to be employable or ability to operate in a global economy.
- Low engineering capacity in SSA relates to **lack of sufficient skills and experience, not numbers**.
- African engineering education should focus on meeting new engineering competencies (including AI, big data ecosystems, smart cities)
- Average <1 engineer/100,000 people across sub-Saharan countries (<http://africacatalyst.org>)
- Need to transform engineering education, curricula and teaching methods **to emphasize relevance and a problem-solving approach to engineering**
- SA-EU study - Develop and utilise evidence to support programme adaptation and integration of climate change adaptation (CCA) and disaster risk reduction (DRR) elements into WASH programme design and implementation.

Response: Water and Wastewater Treatment Process Management Pilot Programmes

- Partners (**FAEO**, DSI, DWS, CSIR, WRC, WASH CoE, CBS) teamed up to build capacity in water and sanitation, **initially to respond to the Covid-19 pandemic** and solve other infrastructure problems in Africa.
- Work integrated learning identified as central to the programme to address the identified occupational competency gaps across infrastructure value chain that is “infrastructure development, operations and maintenance”.
- Delivered **IN SITU** within **management teams** and focused on achieving observable improvements in operational **productivity** and individual leadership competencies.
- Managers should practice effective and efficient performance management behaviour through a structured, on-the-job experiential (ABL) learning process which leads to meaningful and sustained behaviour change.
- **Our primary aim is to close this gap by creating a ‘critical mass’ of competent and committed engineering leaders at all levels able to deliver performance improvements in their engineering-based organisations in specific African countries.**

Course Delivery



- Hybrid: Face-to-face and Online
- 5 days – half technical, half managerial
- Field visit to carry out diagnostic evaluation of water and wastewater treatment plants
- Group presentations – Findings and PIP
- Written assignment – PIP and PDP
- Course Evaluations
- Competency Certificates accredited by Stellenbosch University



Assessment

Individual projects (what we call the Performance Improvement Plan [PIP])

- Each individual was required to define how they manage their departments, how they defined their objectives, how they delivered their operations and how they motivated their people. This involved defining their problems and how precisely they intended to solve them. Reference to models of how performance was to be improved needed to be included (e.g., TQM, SWOT, etc) as did an evaluation of what they have learnt from the experience of doing the project.

A group project

- Each natural working group (the participants' management teams) had to identify their problems (e.g., Non-Revenue Water levels), their solutions and evaluate how well they operate in a team and how they could improve. Clearly participants' individual projects informed the group projects. Reference needed to be made to the content of the Africa We Want Agenda publication.

Personal development plan

- This requires each participant to identify whether they possess the personal competencies required by the organisation (if they are defined) and if not, define how they are going to achieve them. Examples of how international organisations have approached defining and improving the level of skill their managers need were given in the workshop.

Challenges

Water and Wastewater Treatment Process Management Pilot Programmes

- **Virtual delivery mode:**
 - Level of participation and commitment from course participants
 - Network connectivity
- **Participants selection:**
 - Need organizational **TEAMS** in ABL
 - Dealing with different levels of understanding
- **Site visits:**
 - Limited time for course participants to have in-depth analysis of treatment plant
 - Logistics with regards to facilitation at site
- **Funding**

Way Forward

- Upscale the ABL model to the whole of African water and sanitation (W&S) sector and, in time, for all Africa infrastructure organisations, e.g., energy sector.
- Develop long ABL part-time programmes (3, 6 or 12-month versions) pitched at diploma level and be accredited by FAEO and a leading university with Africa-wide credibility.
- Continuous on-the-job mentoring
- More technical and funding partners

Thank you for your attention!!!