

GCRF Africa Catalyst: Capacity building of Professional Engineering Institutions in sub- Saharan Africa –Research Component

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GCRF Africa Catalyst overview

- ▶ **About Us: *The Royal Academy of Engineering***
- ▶ **Our work in Africa**
- ▶ **The GCRF Fund**
- ▶ **Sustainable Infrastructure Call**



GCRF Africa Catalyst research component – *Ecorys UK*

Our **Year 1 (Y1) research** focused on mapping out key engineering actors, challenges for the sector, and inspiring practices to tackle these challenges.

Our **Year 2 (Y2) research** aims to :

- Expand the available **evidence base on good practices** amongst Professional Engineering Institutions (PEIs) in sub-Saharan Africa, in the following thematic areas:
 - *Financial Stability; Membership Engagement, Peer Learning and Support, Collaboration and Engagement, Capacity Building, Diversity and Inclusion*
- Assess PEIs inspiring / best practices in terms of their potential for **transferability**, **sustainability** and **scalability**, and the conditions/circumstances that facilitate this
- Provide a rapid snapshot of PEIs' contribution to tackling the **COVID-19 crisis** as well as **post-crisis role** for PEIs
- Maximise the utility and impact of our research through **dissemination and promotion of emerging findings**

Key 2020 priorities for engineers: what PEIs have been telling us

- ▶ **Tackling the COVID-19 crisis**
- ▶ **“Keeping businesses afloat” in the face of economic recession, public sector corruption, COVID-19**
- ▶ **Sustainable and resilient infrastructures**
- ▶ **Maximising the potential of new technologies in engineering**
- ▶ **Power and transport projects and introduction of competition to bolster economic growth**
- ▶ **Bringing academia and industry closer to improve the employability of graduates**
- ▶ **Updating or better implementing policies and procedures**
- ▶ **Investing in education infrastructures**
- ▶ **Working towards joining the Washington Accord**

Key highlights for PEIs (good practices)

- ▶ **Increasing membership** including through upgrading membership schemes and offering discounted fees (*Tanzania*); hosting awards to incentivise practitioners (*Ghana*), new CPD offers (*Tanzania, Zimbabwe*)
- ▶ **Promoting engineering careers in schools** including through hosting competitions for secondary and university students (*Tanzania*); collaborating with UNESCO to promote engineering career in high schools (*Kenya*) and mentorship programmes (*Sierra Leone*)
- ▶ **Promoting diversity in engineering**: through the implementation of gender mainstreaming programmes, the creation of women's organisations and mentorship programmes and electing women into positions of seniority, dedicated workshops for women in engineering (*Uganda, Kenya, South Africa, Ghana*)
- ▶ **Increased engagement with government**: some PEIs' members are getting into government for the first time, providing greater access and visibility to the engineering profession (*Rwanda*), collaboration with government to bridge technology gaps (*Ghana*)
- ▶ **Focus on compliance**: recruitment of staff dedicated to compliance (*Zimbabwe*)
- ▶ **Aligning curriculum with industry needs** (*Nigeria, Kenya*)

Inspiring practices in focus



Example 1: - Ghana Institute of Engineering (GhIE) and the Ministry of Environment, Science, Technology, and Innovation (MESTI), Ghana

Last year, GhIE and MESTI worked to establish **Technology Design and Manufacturing Centers (TDMCs)** to help bridge the technology gap in the country. The TDMCs serve as a repository for reports on research conducted in Ghana; house a database on Ghanaian engineers, technologists and scientists worldwide and their areas of expertise; provide opportunities for the commercialisation of inventions and innovations into commercially viable products and serve as centre for the upskilling of engineering practitioners. They will also serve as a centres for promoting and protecting intellectual property and patenting Ghanaian innovation, engineering analysis and a place for Design-for-Manufacturing Assembly (DFMA). It is intended that these centres will be a 'learning factory' where practice, education and research are integrated to foster the development of competencies of trainees and practitioners. The centres will help achieve the government's Ghana Beyond Aid agenda (to reduce reliance on aid) and address youth unemployment.

Example 2: Diversity in Engineering – SAICE, South Africa

SAICE initiated the Growing Forward Strategy, a long-term expansion strategy to cater to the needs of specific member segments (students, graduates etc.) and develop policies that address gender diversity and inclusivity.

As part of this strategy, SAICE has created a new **Diversity Panel focused on gender, race and sexuality** to raise awareness on inclusiveness, and develop opinion pieces and guidelines for employers on issues such as sexual harassment in the workplace. SAICE also tries to encourage children and young women to engage with STEM subjects and enter the engineering profession by conducting awareness-raising events in schools.

Example 3: Informing policy-making – ZIE, Zimbabwe

To allocate resources and invest in engineering, the government needs to be aware of the national needs and gaps in existing infrastructures in the fields of telecoms, power, electricity, energy, etc. ZIE is rolling out a **national infrastructure scorecard to provide that overview**. ZIE has been carrying out ground work, namely collecting data across multiple projects and conducting desk research to achieve a comprehensive mapping. For example, in the energy sector, ZIE uses annual updates from system development plans that provide data on existing infrastructure, age of infrastructure, refurbishing needs etc

This project is directly aligned with the ongoing FAEO Infrastructure Report project for Sub Saharan Africa, and the Africa Infrastructure Report App.

Key objectives and future plans for PEIs

- ▶ Continue to grow membership and expand membership engagement (thereby revenue base)
- ▶ Improve digital capabilities: to better communicate with members, enable members to register online
- ▶ Further improve CPD offer
- ▶ Promote diversity in engineering
- ▶ Continue influencing policy in order to shape new and revised legislation
- ▶ Tackle corruption in the engineering sector
- ▶ Bridge the gap between academia and industry, and improve engineering education quality
 - Through facilitating networks and exchange; funding of student innovations; dedicated work-placement schemes; improving education quality*
- ▶ Raise international profile

COVID-19 Rapid Response Research



COVID19 Rapid Response Research

- ▶ **Why?** In the course of our existing research mandate for RAE, we found evidence that PEIs are leading initiatives to tackle the crisis. This is therefore a unique opportunity to document the **response of the engineering community to a global health pandemic**, as well as the **role PEIs can play in helping to meet post-crisis societal needs**
- ▶ **What?** Building on our existing networks from the Africa Catalyst research, and working with FAEO we will build a **snapshot of PEIs' contributions to tackling the COVID-19 crisis in 10 countries: 5 Africa Catalyst and 5 FAEO member countries**. The output will be a report with case studies, to be disseminated widely
- ▶ **How?** We will carry out desk research and interviews with PEIs representatives and international stakeholders (World Bank, WFEO, industry representatives, etc.)
- ▶ **How is this helping?** We anticipate that this research will provide inspiration and learning opportunities for PEIs about how they can best respond to the crisis, and what to anticipate. We hope that this will contribute to RAE's leadership role in helping PEIs to shape their post-crisis responsibilities

Early findings in engineering responses to Covid-19

Botswana University (UB) developed a **web map visualization** and **live tracking dashboard** on COVID-19 cases

UB and Chinese Embassy entered into partnership to establish **Engineering and Technology Innovation Centre** to support development of PPE, eg face shields, ventilation hoods, face masks, ventilators, which will assist UB staff, students and the public **to turn viable business ideas into physical prototypes**

The Africa Centre of Excellence (ACE) in Materials, Product Development and Nanotechnology at Makerere, Uganda, in partnership with a local engineering company, has developed a **“self-sanitising” facemask** with an inbuilt sanitiser

Women in Engineering Ghana (WinE Ghana) developed a proposal to re-engineer markets in Ghana for the COVID-19 period and beyond. The proposal was presented to government ministers with a very positive response. Further WinE developed various locally made baskets, nose marks, hand sanitizers and veronica buckets to be distributed in selected markets in Accra, Kumasi and Tema

Kenyatta University, Kenya recently unveiled a **prototype ventilator** allegedly costing only US\$5,000, a quarter of the cost of a conventional machine. The university's engineering and biomedical engineering departments may be able to produce 50 every week.

Local engineers from **Bafoussam at L'Agence Universitaire pour L'innovation in Cameroon** have produced prototypes of ventilator and a vaporized sanitizing door. The initiative is being run in collaboration with a local organisation who supervised previous productions as the clinic served as a platform to test prototypes.

Further steps

- ▶ We would love to hear more from you about **good practices and learning** and **promising interventions in engineering to tackle COVID-19**, so we can capture and disseminate it! We are particularly interested in innovative activities within our six working themes
- ▶ Let us know about any **feedback and/or suggestions** you might have about our research
- ▶ Let us know if you are interested to **collaborate in disseminating our research findings**

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Dissemination

Learning Webinar (week commencing 26 October 2020 – final date TBC)

Hosted by Ecorys, Royal Academy of Engineering (RAE), and Federation of African Engineering Organisations (FAEO)

- ▷ To share and validate Ecorys' emerging findings on [PEI's best practices](#) to date [and the engineering communities responses to COVID-19](#)
- ▷ Open to any interested stakeholders- PEI representatives, FAEO members, other interested engineering community stakeholders
- ▷ Outcomes of this learning webinar will feed into our deep dive report

Research Team

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