

**Background Note 2 for  
UN Workshop on building capacity and scaling up adoption of STI4SDGs Roadmaps in  
Africa**

**Oct. 12-13, 2023, in Addis Ababa, Ethiopia; co-organized by DESA, ECA, and EC/JRC.**

**Prepared by Dr. Marlene Kanga, World Federation of Engineering Organizations  
(WFEO)**

**The potential Support by the WFEO to The Coalition on Science Technology  
and Innovation (STI) for Africa Development**

**Background**

The United Nations 2030 Agenda for Sustainable Development, with its 17 Sustainable Development Goals (SDGs) and 169 targets, provides a universally accepted and comprehensive framework addressing all aspects and dimensions of sustainable development.

The Technology Facilitation Mechanism (TFM) supports the application of science, technology, and innovation (STI). The aim is to enhance North-South, South-South and triangular regional and international cooperation on and for access to STI and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms.

The African Union adopted 'Agenda 2063: The Africa We Want' whose aspirations and goals align very well with the goals of the 2030 Agenda for Sustainable Development. The STI Strategy for Africa 2024 (STISA-2024) was also adopted and has four pillars: a) infrastructure development; b) building technical competencies, c) promoting innovation and entrepreneurship and d) establishing an enabling environment.

WFEO is committed to advancing the UN Sustainable Goals through engineering. This was declared in the Paris Declaration March 2018, as part of the organisations 50<sup>th</sup> anniversary celebrations, among the first engineering institutions in the world to develop this important message. This message was also repeated in the Second UNESCO Engineering Report, "*Engineering for Sustainable Development*", released by UNESCO in March 2021, and which had key messages on the importance of engineering in advancing the 2030 Agenda.

**The Africa Coalition for Science Technology and Innovation (STI) in Africa**

The Africa Coalition for Science Technology and Innovation in Africa was formed as an outcome of the inaugural Africa Day held on 2 May 2023 at the United Nations New York on the side lines of the UN Science Technology and Innovation Forum.

The Coalition is a multi-stakeholder, interest group where Member States wishing to share experiences, resources, and practices in addressing common complex challenges can hatch and nurture new initiatives that can benefit national and global STI capabilities to accelerate the attainment of the SDGs and the aspirations of their people. The Coalition will serve as a global go-to place and platform to identify, refine, and incubate scalable international action and cooperation on STI for the SDGs in Africa. The Coalition is led by the African member states of South Africa, Morocco, Ethiopia, and Ghana with the support of the UN Department of Economic and Social Affairs (DESA) and UN Economic Commission on Africa (ECA) WFEO is a Strategic Partner of the Coalition and will coordinate relevant projects in engineering that advance the SDGs and align with the objectives of the Coalition

**INTERNATIONAL ENGINEERING LEADERSHIP FOR SUSTAINABLE DEVELOPMENT**

FMOI/WFEO: Maison de l'UNESCO 1, rue Miollis 75015 Paris, France  
Tél: +33 (0)1 45 68 48 46 Fax: +33 (0)1 45 68 48 65 email: [executivedirector@wfeo.org](mailto:executivedirector@wfeo.org)  
Web site: [www.wfeo.org](http://www.wfeo.org)

The Africa Coalition for Science, Technology, and Innovation (STI) for Africa will create a pathway for African states to develop, deploy, and expand their use of STI in the context of the SDGs. Its objective is

- (I) relying on the potential of African people, especially its youth and diaspora, to expand financial and educational opportunities to find workable and scalable STI solutions for the African states;
- (II) work within the African Continental Free Trade Area with African financial firms, and Africa's growing industrial base to increase investments into research and development and build out its infrastructure to support the STI for the SDGs;
- (III) develop STI roadmaps at national and sub-national levels and implement related capacity building activities for African states and their stakeholders;
- (IV) develop and enhance the agenda of STI for Africa in the UN processes and mechanism.

### **WFEO Can Serve as a Strategic Partner of the Africa Coalition for STI**

The World Federation of Engineering Organisations (WFEO) is the Co-Chair of the Science and Technology Group at the Major Group of Stakeholders at the United Nations. WFEO is the leading global engineering institutions with members from 100 national, continental, and regional professional engineering institutions, representing more than 30 million engineers. It is an affiliate of UNESCO and is accredited by the UN Economic and Social Commission (ECOSOC).

Engineering Institutions from 27 out of 54 member states and the Federation of African Engineering Organisations (FAEO), are members of WFEO. The President-Elect of WFEO, Eng. Mustafa Shehu will hold office from Oct 2023 –Oct 2025. WFEO is well placed to support the objective of the Coalition, in particular, to scale international action and cooperation on STI for the SDGs in Africa.

WFEO and its Standing Committees and partners propose existing projects that can be scaled up for delivery across the member states of the Africa Union. Representatives to WFEO Committees are world-leading experts in relevant fields including water, energy, and environment, and engage with women and young engineers. The proposed projects activate the objective (iii) of the Coalition – *“to develop STI roadmaps at national and sub-national levels and implement related capacity building activities for African states and their stakeholders”*.

As a strategic partner of the Africa Coalition for STI, WFEO will facilitate the collaboration of WFEO members, committees and partners, with UN DESA, UN ECA and members of the Africa Union that are part of the Africa Coalition, to advance the UN SDGs, especially through engineering.

The following WFEO committees, members and partners have agreed to participate in the Coalition.

1. WFEO Young Engineers Future Leaders Committee – capacity building and professional development for young engineers
2. WFEO Academy – Online training and professional development for engineering educators and qualified engineers, technologists and technicians
3. Federation of African Engineering Organisations (FAEO), WFEO Member, – implementation of renewable energy projects, mainly capacity building, however, requires significant funding to proceed.
4. International Network for Women Engineers and Scientists (INWES) Africa Regional Network – formation and support for women in STEM networks in Africa
5. Office of Climate Change Education (UNESCO Category II Centre) – capacity building for climate change education through the African *Regional Resilience Initiative on Climate Education (ARRICE)* Project

6. International Centre for Engineering Education (ICEE), Tsinghua University China, (UNESCO Category II Centre), capacity building in engineering, however, significant funding is required to proceed.
7. Global Infrastructure Anti-Corruption Centre – training for engineering in dealing with corruption in infrastructure projects at no cost.
8. TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre), training for engineers, technologists and technicians, however, significant funding is required to proceed, six projects have been proposed.
9. Royal Academy of Engineering – Africa Catalyst and other projects for capacity building in engineering in Africa, details are to be confirmed.

The Coalition is in the process of being established and specific project outcomes and timelines are to be confirmed. It is expected that each member of the Coalition will progress their own projects independently and report to the leaders of the WFEO Africa Coalition and UN DESA and UN ECA, at the UN STI Forum at least annually.

The Africa Coalition is a significant initiative and a further opportunity for WFEO to demonstrate its leadership in advancing the UN Sustainable Development Goals through engineering.

**Prepared By**

Dr K.N. Gunalan, Chair WFEO UN Relations Committee, Co-Chair UN Major Group of Stakeholders Group and Science and technology Major Group of Stakeholders

Dr Marlene Kanga, Former President I (2017-2019), World Federation of Engineering Organisations.

27 September 2023.

### WFEO AFRICA COALITION: SUMMARY OF PROJECTS

No.	Organisation	Project Title	Focus	Status	Funding Required
1	WFEO Young Engineers Future Leaders Committee	Empowering Young Engineers for Sustainable Infrastructure and Resilience in Africa	Training in transportation, energy, water, communication, and urban development.	Established model, can be scaled up.	Additional funding required to scale up
2	WFEO Academy –and qualified engineers, technologists and technicians	WFEO Academy: Online training and professional development for engineering educators and qualified engineers	Training for engineering educators and professional development for qualified engineers	Established model, can be scaled up	USD60,000 – 3 years for ongoing development and scale up
3	Federation of African Engineering Organizations (FAEO), WFEO Member	Sustainable Infrastructure Development for Clean Energy Access in Rural Africa	Renewal energy in rural areas	To be established	USD 10 million
4	International Network for Women Engineers and Scientists (INWES) Africa Regional Network	Empower Africa Plus: Advancing Africa Women in Science, Innovation, and Entrepreneurship for Sustainable Development	Capacity building for women engineers	Pilot completed with British Council	Significant funding required.
5	Office of Climate Change Education (UNESCO Category II Centre)	African Regional Resilience Initiative on Climate Education (ARRICE)	Teacher training for climate change education	Pilot project completed in Mauritius, Nov 2022	USD 300,000, other funding sources available also
6	International Centre for Engineering Education (ICEE), Tsinghua University China, (UNESCO Category II Centre),	Construction of Skills Training and Practical System for African Highway Operation and Management Talents	Training in construction for highway infrastructure	Phase 1 in progress 2023-25, Phase 2 and Phase 3 to 2031	Stage 1: USD 200,000 Stage 2: USD 1 million
7	Global Infrastructure Anti-Corruption Centre	Anti-Corruption Training for engineers involved in the development of infrastructure in Africa	Training for engineers in anti corruption in infrastructure projects	Well established resources online training	Nil
8a	TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre)	Enhancing Industrial Mechanics' Capacity to utilize CNC technologies in manufacturing to Safeguard Livelihoods	Training industrial mechanics to use computer numerical control technologies	CNC equipment acquired (US\$ 1 million)	USD \$300,000

No.	Organisation	Project Title	Focus	Status	Funding Required
8b	TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre)	Enhancing Auto Mechanics' Capacity to Maintain Modern Automobiles to Safeguard Livelihoods	Training for auto mechanics to service modern vehicles	Initial training provide	USD \$750,000
8c	TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre)	Women empowerment through modernization of indigenous clean energy cooking utilizing climate change adaptation materials	Development of women entrepreneurs for clean cooking technologies	\$100,000 for developing prototype alternative cooking stoves	USD 600,000
8d	TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre)	Embracing Pozzolana: A Sustainable Solution for Reducing Climate Impact in Oil and Gas Cementing, Minimizing Reliance on Polluting Portland Cement and Bentonite Clay	R&D for use of pozzolona clay as a lubricant in oil and gas well drilling	To be established	USD 1 million
8e	TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre)	Dealing with heavy metals in mine tailings and mined site-contaminated soil: An approach of integrated phyto and bioremediation (ROHMIBRA) Technology	R&D for technologies to clean up mine tailings and contaminated mines	Indigenous plants identified to absorb heavy metals from mine sites	USD 500,000
8f	TCC, Kwame Nkrumah University of Science and Technology, Ghana, (UNESCO Category II Centre)	Empowering Industrial Mechanics: Accessible CNC Technology for Enhanced Productivity and Quality Job Delivery	Development of computerised numerical control technologies	Early Designs have been developed	USD 50,000
9	Royal Academy of Engineering – Africa Catalyst and other projects	Engineering education and development of engineering institutions in Sub-Saharan Africa	Capacity building for engineering education and development of professional engineering institutions	Africa cataclysm Phases 1-4 have been delivered since 2016	TBC

**PROPOSAL 1: WFEO YOUNG ENGINEERS FUTURE LEADERS COMMITTEE - A WFEO STANDING POLICY IMPLEMENTATION COMMITTEE**

<b>Project Title</b>	<b>Empowering Young Engineers for Sustainable Infrastructure and Resilience in Africa</b>
<b>Project Leader</b>	Eng. Firas Bou Diab, Chair WFEO Young Engineers/Future Leaders Committee, a standing committee of WFEO
<b>Relevant SDG</b>	Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure), Goal 11 (Sustainable Cities and Communities), Goal 13 (Climate Action), Goal 17 (Partnerships for the Goals)
<b>Project Scope</b>	The project aims to engage young engineers in addressing the infrastructure and sustainability challenges faced by African countries. It will focus on empowering and equipping young engineers with the necessary knowledge, skills, and resources to lead and implement engineering solutions aligned with the UN SDGs. The project will cover multiple sectors, including transportation, energy, water, communication, and urban development.
<b>Achievements to Date</b>	Capacity Building Workshops: Conducted workshops on sustainable engineering practices, and climate resilience for young engineers.  Networking and Knowledge Exchange: Established platforms for young engineers to connect, share ideas, and collaborate on projects through webinars, online forums, and networking events.
<b>Proposed Method of Project Delivery and Schedule</b>	Training and Workshops: Organize capacity-building workshops and training sessions for young engineers, emphasizing sustainable infrastructure and resilience.  Project Incubation: Facilitate project incubation, where young engineers can present their innovative ideas and receive guidance on implementation strategies.  Regional Hubs: Establish regional hubs for engineering innovation to foster collaboration and knowledge dissemination among young engineers.  Collaboration with WFEO Standing Committees: Engage young engineers in ongoing projects and initiatives led by WFEO Standing Committees that align with the project's objectives.
<b>Funding Available and Required</b>	Funding Available: WFEO's existing budget for capacity-building initiatives Contributions from partner engineering institutions and sponsors  Funding Required: Additional funding to expand the project's reach and impact Sponsorships from corporate partners and international organizations
<b>Other Resources Available and Required</b>	Resources Available:  WFEO's network of engineering experts and professionals Access to WFEO's knowledge base and best practices in sustainable engineering  Resources Required:  Support from African governments and engineering associations Partnerships with local NGOs and community organizations

<b>Links for Further Information</b>	<a href="https://www.wfeo.org/committee-young-engineers-future-leaders/">https://www.wfeo.org/committee-young-engineers-future-leaders/</a>
<b>Other Relevant Information</b>	<p>The project will prioritize gender balance and inclusion, encouraging more young women to pursue careers in engineering and play an active role in sustainable development initiatives.</p> <p>Young engineers will be encouraged to collaborate with experienced professionals and explore innovative technologies and practices to address Africa's unique challenges.</p>

**PROPOSAL 2: WFEO COMMITTEE FOR EDUCATION IN ENGINEERING – WFEO ACADEMY – A SUB COMMITTEE OF THE WFEO STANDING TECHNICAL COMMITTEE FOR EDUCATION IN ENGINEERING**

<b>Project Title</b>	<b>WFEO ACADEMY - : Online training and professional development for engineering educators and qualified engineers</b>
<b>Project Leader</b>	Dr Marlene Kanga, WFEO Past President and Chair Sub Committee for WFEO Academy, WFEO Committee for Education in Engineering, a Standing Committee of WFEO
<b>Relevant SDG</b>	4, 16, 17
<b>Project Scope</b>	The WFEO Academy activates the UNESCO Open Science Principles by providing knowledge transfer to countries that need to train engineering educators and engineering education accreditation organisations for quality engineering education.
<b>Achievements to Date</b>	The World Federation of Engineering Organizations launched the WFEO ACADEMY training portal on World Engineering Day, on 4 March 2022, with UNESCO and its partners, the International Engineering Alliance (IEA), the International Federation of Engineering Education Societies (IFEES) and the Global Engineering Deans Council (GEDC) and WFEO members and affiliates.
<b>Proposed Method of Project Delivery and Schedule</b>	<p>WFEO ACADEMY provides training for engineering education accreditation bodies and engineering educators to develop the accreditation processes, curriculum and pedagogies for outcomes based education that are also a key requirement to achieve the international benchmarks in engineering education. Training is also provided for qualified engineers, technologists and technicians for essential skills in areas such as safety, risk, project management, ethics and leadership that are required across all disciplines and are essential for competent and responsible practice.</p> <p>The courses are targeted to meet specific objectives for educators and assessors to reach international standards in engineering education.</p> <p>The courses are carefully selected and are on key topics that are relevant to outcomes based education, teaching methodologies and curriculum design that align with the International Engineering Alliance Graduate Attributes and Professional Competencies Framework and the procedures to become a signatory of the International Engineering Alliance.</p> <p>There are currently 30 courses comprising webinars/presentation on the website in different categories. Two new courses are added approximately every month. Additional courses can be added more quickly if additional resources are available</p>
<b>Funding Available and Required</b>	Limited funding from UNESCO. Additional funding is required to grow the number of courses that are included. USD 20,000 p.a.
<b>Other Resources Available and Required</b>	Nil
<b>Links for Further Information</b>	<a href="http://www.wfeoacademy.com">www.wfeoacademy.com</a>



<b>Other Relevant Information</b>	UNESCO has recognized the importance of the WFEO ACADEMY as it progresses key recommendations of the Second UNESCO Engineering Report (in particular to train more engineers with the right skills), as well as the UNESCO Open Science Principles. A message of support has been provided by the former UNESCO Assistant Director Natural Sciences Sector General Ms Shamila Nair-Bedouelle and is available on the website.
-----------------------------------	---

**PROPOSAL 3: FEDERATION OF AFRICAN ENGINEERING ORGANISATIONS (FAEO) – AN INTERNATIONAL MEMBER, FOR CONTINENTAL AFRICA, OF WFEO**

<b>Project Title</b>	<p><b>SUSTAINABLE INFRASTRUCTURE DEVELOPMENT FOR CLEAN ENERGY ACCESS IN RURAL AFRICA</b></p> <p>This addresses crucial SDGs related to affordable and clean energy, sustainable infrastructure, climate action, and partnerships for sustainable development. The project's comprehensive approach, including assessment, renewable energy installation, capacity building, community engagement, and monitoring, ensures a systematic and efficient implementation process.</p> <p>With the available funding and the proposed method of project delivery, the project is poised to make significant contributions to improving energy access and sustainable development in rural Africa.</p>
<b>Project Leader</b>	Eng. Papias Kazawadi, President FAEO. FAEO is an international member of WFEO.
<b>Relevant SDG</b>	SDG 7, SDG 9, SDG 11, SDG 13 and SDG 17 .,
<b>Project Scope</b>	<p>Assessment and Planning: Conducting an in-depth evaluation of energy needs and existing infrastructure in target rural areas, identifying suitable sites for renewable energy system installation, and developing a comprehensive project plan.</p> <p>Renewable Energy Systems Installation: Implementing off-grid and mini-grid renewable energy systems (solar, wind, or hydroelectric power) in rural communities to provide electricity access.</p> <p>Energy-Efficient Technologies Deployment: Promoting the adoption of energy-efficient technologies in households and businesses, such as energy-saving cookstoves, LED lighting, and low- power appliances.</p> <p>Capacity Building and Training: Providing training programs to build the technical capacity of local engineers, technicians, and communities in renewable energy systems.</p> <p>Community Engagement and Empowerment: Engaging local communities in project design and decision-making, raising awareness about clean energy benefits, and promoting entrepreneurship opportunities in the renewable energy sector, particularly for women and youth.</p> <p>Monitoring and Evaluation: Establishing a robust framework to track project performance, energy access improvements, energy savings, and socio-economic benefits.</p> <p>Policy Advocacy and Stakeholder Engagement: Engaging with relevant stakeholders and policymakers to advocate for supportive policies and regulations related to clean energy access and sustainable infrastructure development.</p>
<b>Achievements to Date</b>	The project has completed the Project Charter and Project Initiation phase, which involved assessing energy needs and infrastructure in target rural areas, identifying potential project sites, and engaging stakeholders to establish partnerships.

<b>Proposed Method of Project Delivery and Schedule</b>	<p>The project is divided into four phases:</p> <ul style="list-style-type: none"> <li>• Project Initiation and Planning: 6 months</li> <li>• Design and Preparatory Activities: 3 months</li> <li>• Implementation: 12 to 24 months</li> <li>• Monitoring, Evaluation, and Optimization: Ongoing throughout the project</li> </ul>
<b>Funding Available and Required</b>	Required Funding: US\$ 10,000,000
<b>Other Resources Available and Required</b>	Nil
<b>Links for Further Information</b>	Nil
<b>Other Relevant Information</b>	Nil

**PROPOSAL 4: INTERNATIONAL NETWORK FOR WOMEN ENGINEERS AND SCIENTISTS (INWES) AFRICA REGIONAL NETWORK – A WFEO PARTNER ORGANISATION**

<b>Project Title</b>	<b>Empower Africa Plus: Advancing Africa Women in Science, Innovation, and Entrepreneurship for Sustainable Development</b>
<b>Project Leader</b>	Associated teacher Rufina Dabo SARR, Chair of INWES Africa Region Network (ARN)..
<b>Relevant SDG</b>	<ul style="list-style-type: none"> <li>- Goal 5: Gender Equality, Goal 9: Industry, Innovation, and Infrastructure,</li> <li>- Goal 13: Climate Action, Goal 2: Zero Hunger,</li> <li>- Goal 7: Affordable and Clean Energy, Goal 4: Quality Education and</li> <li>- Goal 17: Partnerships for the goals.</li> </ul>
<b>Project Scope</b>	<p>Empower Africa Plus is a visionary initiative aimed at tackling the gender disparity in scientific publication and entrepreneurship across Africa for the sustainable development of our continent, and also tackle the issue of climate change, energy, food security etc. Despite significant strides in various sectors, African women continue to face significant barriers when it comes to pursuing careers in science, innovation, and entrepreneurship.</p> <p>These barriers include limited access to education, lack of role models, inadequate resources, and societal biases. Empower Africa Plus aims to dismantle these barriers and create an environment where African women can thrive and lead in these crucial sectors. This multifaceted project goes beyond conventional approaches by fostering the holistic development of professional women in science and innovation through targeted interventions in scientific publishing, entrepreneurship, and education. The project also encompasses mentorship programs and extensive networking to create a dynamic community of empowered women professionals, effecting transformative change throughout the African continent.</p> <p>The project's triumphs are poised to serve as a blueprint for analogous endeavours within the African Union, fostering an ecosystem of cooperation and knowledge exchange among member states. Through meticulously crafted workshops, nurturing mentorship, and a centralized repository, Empower Africa Plus envisions cultivating a self-sustaining paradigm that empowers women professionals to be trailblazers, driving not just personal success, but collective progress within their communities and the entirety of the continent.</p>
<b>Achievements to Date</b>	<p>Pioneered strategic partnerships with esteemed universities, leading research institutions, and gender equality-focused organizations to facilitate impactful workshops on scientific publication and entrepreneurship.</p> <p>Successfully conducted pilot work done in collaboration with the British Council, resulting in a significant upsurge in research publications and an amplified understanding of entrepreneurship among participating women professionals. Established a rapidly expanding repository of remarkable women scientists, engineers, and entrepreneurs, amplifying their narratives of success and contributions to various fields. Secured initial funding from progressive philanthropic entities and government grants, laying the foundation for the project's robust implementation.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<ul style="list-style-type: none"> <li>- Identification of Synergistic Partnerships: Forge dynamic collaborations with universities, research institutions, and entities championing gender equality in the domains of science, entrepreneurship, and education.</li> </ul>

	<ul style="list-style-type: none"> <li>- Holistic Workshop Design and Execution: Curate comprehensive workshops and Master classes integrating scientific writing skills, entrepreneurial acumen, and real-world case studies. These initiatives will be thoughtfully rolled out across targeted regions within Africa.</li> <li>- Nurturing Mentorship Network: Develop a well-structured mentorship ecosystem that bridges experienced women professionals with budding scientists and entrepreneurs.</li> <li>- Creation of an Interactive Database: Construct an online platform showcasing profiles of accomplished women professionals, their milestones, and opportunities for mentorship.</li> <li>- Effective Advocacy and Outreach: Collaborate with key stakeholders like the African Union and the Africa Development Bank to garner support and extend the project's footprint.</li> </ul>
<b>Funding Available and Required</b>	No funding is available at the moment, but this project can be funded by regional and international institutions.
<b>Other Resources Available and Required</b>	<ul style="list-style-type: none"> <li>- Available Resources: <ul style="list-style-type: none"> <li>● Existing alliances with universities, research institutions and, private sector</li> <li>● Proficient mentors within the INWES ARN.</li> <li>● Established rapport with the British Council through the innovation for African Universities (IAU) initiative.</li> </ul> </li> <li>- Required Resources: <ul style="list-style-type: none"> <li>● Subject matter experts in scientific writing and entrepreneurship</li> <li>● Technological infrastructure for database development and upkeep</li> <li>● Strategies for marketing and communication for robust outreach and awareness drives</li> </ul> </li> </ul>
<b>Links for Further Information</b>	Comprehensive Overview of the Empower Africa Plus Project Insight into the INWES ARN Network's Influence and Collaborative Endeavours with the British Council.
<b>Other Relevant Information</b>	Empower Africa Plus is seamlessly aligned with the African Union's Agenda 2063 and the Science, Technology, and Innovation Strategy for Africa (STISA-2024). By effectively bridging the gender gap in scientific publication and entrepreneurship, this initiative directly contributes to addressing pressing challenges such as climate change, food security, energy access, youth unemployment, gender equality and quality education across the African landscape.

**PROPOSAL 5: OFFICE OF CLIMATE CHANGE EDUCATION (OCE) A UNESCO CATEGORY II CENTRE, PARIS - A WFEO PARTNER ORGANISATION**

<b>Project Title</b>	<b>African Regional Resilience Initiative on Climate Education (ARRICE)</b>
<b>Project Leader</b>	Office for Climate Education (OCE) David Wilgenbus, executive director: <a href="mailto:david.wilgenbus@oce.global">david.wilgenbus@oce.global</a>
<b>Relevant SDG</b>	Most relevant SDGs: Climate action (13), quality education (4) Other relevant SDGs: biodiversity on land and in the ocean (14 & 15), health (3), sustainable agriculture (2), sustainable cities (11)
<b>Project Scope</b>	<p>African countries are among the most affected by climate change, which disproportionately affects disadvantaged populations, including women and minorities. It is therefore more relevant than ever to promote climate change education in Africa, in order to provide teachers, students and communities with the knowledge, skills and abilities necessary for climate resilience.</p> <p>Drawing on the rich experience gained in its flagship project <i>América Latina para la Educación Climática</i> (ALEC), the OCE, in partnership with local organizations and institutions, is currently launching a climate change education pilot project in Africa, ARRICE. The general objective of ARRICE is to enhance quality climate change education in primary and secondary schools to foster transformative learning environments for climate resilience.</p> <p>Three pilot countries have been identified for this project: Mauritius, Kenya and Senegal. The regional approach of the project makes it possible to consider each country as a regional hub for disseminating best practices and lessons learned for quality climate change education to other African countries.</p>
<b>Achievements to Date</b>	<p>The project is planned to be launched in 2024.</p> <p>A pilot workshop has been organized in Mauritius in Nov. 2022, in partnership with WFEO and UNESCO, in order to train teachers, teacher trainers and curricula officers from the ministry of education.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>To ensure the sustainability of the project and its appropriation in the different contexts, national project coordinators have been involved from the beginning of the co-construction of ARRICE and will be responsible for the local implementation of the project. They will also ensure the support coordination with national educational and environmental authorities. The national coordinators of ARRICE are:</p> <ul style="list-style-type: none"> <li>● Mauritius: Mauritius Institute of Education and Reef Conservation</li> <li>● Kenya: Kenyan Organization for Environmental Education</li> <li>● Senegal: ENDA Energie</li> </ul> <p>The ARRICE implementation is organized in 4 pillars:</p> <ul style="list-style-type: none"> <li>● <u>Educational resources</u>: Creating, adapting, and disseminating quality educational resources, free of charge, adapted to local contexts, and intended for all stakeholders (teachers, trainers, students, supervisory staff, community). These resources aim to develop a transdisciplinary understanding of climate change in its environmental and socio-economic dimensions and promote critical thinking and a commitment to action.</li> <li>● <u>Teacher training and support</u>: Supporting teachers' professional development through a range of training and field support to improve the integration of climate change education in their educational practices.</li> <li>● <u>Schools and/in communities</u>: Supporting student engagement by promoting school-led initiatives for transformative action on climate change (adaptation and/or mitigation micro projects), by fostering the role of schools in and within communities and local environment.</li> <li>● <u>Public policies</u>: Defining an extension strategy for the project with a view to integrate and sustain climate change education in national and regional education systems in Africa.</li> </ul>

	<p>Over the 4 years of the pilot phase (2024-2027), ARRICE will closely work with ~100 pilot schools in Kenya, Mauritius and Senegal, involving ~3000 teachers and ~150 000 students (9-15 years old). The “whole-school approach”, highlighted by UNESCO, places climate action in all aspects of school life (teaching content, based on solid science and technology, but also school governance, participation of all stakeholders and communities) in order to bring together various skills and knowledge and thus address climate in a comprehensive and inclusive manner.</p>
<b>Funding Available and Required</b>	<p>The global budget of the project is 3.1 million USD. Half of the funding is provided by the French government. The OCE and the national coordinators are currently looking for additional funding.</p> <p><b>The project would require a funding of 300,000 USD from the UN DESA Coalition.</b></p>
<b>Other Resources Available and Required</b>	<p>As an in-kind support: involvement of the scientific community and the engineering organizations, to provide scientific expertise (validation of education materials, participation in teacher training workshop and high-level events).</p>
<b>Links for Further Information</b>	<p>Example of previous education materials developed by the OCE (not within the ARRICE project): <a href="https://www.oce.global/en/ressources">https://www.oce.global/en/ressources</a></p>
<b>Other Relevant Information</b>	<p>The OCE was created in 2018 in response to Article 12 of the Paris Agreement, highlighting the importance of climate change education. Under the auspices of UNESCO, the OCE is also an observer organization to the Intergovernmental Panel on Climate Change (IPCC), thus placing the Office in a unique position to mobilize both its scientific and educational expertise to contribute to the Sustainable Development Goals.</p> <p>The founding members of the OCE are the French National Centre for Scientific Research (CNRS), the French National Research Institute for Sustainable Development (IRD), Météo-France, the Meteorological Society of France (Météo &amp; Climat) and Sorbonne University.</p>

**PROPOSAL 6: THE INTERNATIONAL CENTRE FOR ENGINEERING EDUCATION, A UNESCO CATEGORY II CENTRE, TSINGHUA UNIVERSITY CHINA - A WFEO PARTNER ORGANISATION**

<b>Project Title</b>	<b>Construction of Skills Training and Practical System for African Highway Operation and Management Talents</b>
<b>Project Leader</b>	The leaders come from the Base of Global Leadership Development which jointly launched by International Centre for Engineering Education (ICEE) and China Harbor Engineering Company Ltd. (CHEC). SHI Zhihui from KHM company (CHEC), SHEN Ye from ICEE
<b>Relevant SDG</b>	Establish a skill training and practical system for African highway operation and management talents, evaluate their skill levels through professional skill appraisal institutions, and then gradually achieve the online registration and access to the network of certified highway operation and management talents. The project is directly related to the SDG 9 (Industry, Innovation, and Infrastructure), SDG 11 (Sustainable Cities and Communities), SDG 17 (Partnerships).
<b>Project Scope</b>	Cultivate, practice, and identify skilled talents related to highway operation, including toll collection skilled talents, monitoring skilled talents, maintenance skilled talents, and electromechanical skilled talents, and provide initial, intermediate, and advanced skill training and identification for the above talents. Talents who pass the appraisal will be issued with certificates and registered in the talent pool, which can be found online.
<b>Achievements to Date</b>	Since 2023, KHM company has collaborated with the Skills Appraisal Center of China Communications Construction Company Ltd. (CCCC) to provide professional skills training and business guidance for 32 toll collectors and 8 monitoring personnel of the company for three consecutive months. The company achieved good results in the "Cameroon First Highway Toll Collector and Monitoring Personnel Primary Vocational Skills Appraisal" organized by the Skills Appraisal Center of CCCC in May 2023. Among them, 24 toll collectors and 6 monitoring personnel successfully obtained the Junior Vocational Skill Level Certificate.
<b>Proposed Method of Project Delivery and Schedule</b>	Phase 1: In the initial stage (2023-2025), KHM will further cooperate with the Skills Appraisal Center of CCCC to establish a more comprehensive and comprehensive skills appraisal training practice system.  Phase 2: Improve the verification stage (2026-2030), further improve the skills appraisal system of the CCCC Skills Appraisal Center for highway operation and management talents, and practice, verify, and improve it globally to make it suitable for the training, appraisal, and information management of early, middle, and senior talents in highway operation and management worldwide.  Phase 3: Promotion stage (starting from 2031), forming a comprehensive and applicable training, appraisal, and information management platform for early, middle, and senior talents in highway operation and management worldwide. The platform identifies and registers more than 50000 skilled talents, and establishes highway vocational skill appraisal training stations in suitable locations around the world. And provide training, appraisal, and employee recommendation services for global highway operation units.
<b>Funding Available and Required</b>	The first stage requires an estimated investment of <b>USD 200,000</b> The second phase requires an estimated investment of <b>USD 1 million</b> The third phase requires an estimated investment of <b>USD 5 million</b>



<b>Other Resources Available and Required</b>	Required resources: This skill appraisal platform solution needs to receive more and broader publicity and investment opportunities.
<b>Links for Further Information</b>	Nil
<b>Other Relevant Information</b>	Nil

**PROPOSAL 7: GLOBAL INFRASTRUCTURE ANTI-CORRUPTION CENTRE (GIACC) - A COLLABORATING ORGANISATION WITH THE WFEO COMMITTEE ON ANTIC CORRUPTION, A WFEO STANDING POLICY IMPLEMENTATION COMMITTEE**

<b>Project Title</b>	<b>Anti-Corruption Training for engineers involved in the development of infrastructure in Africa</b>
<b>Project Leader</b>	Mr Neill Stansbury, CEO and Founder, Global Infrastructure Anti-Corruption Centre
<b>Relevant SDG</b>	4, 16, 17
<b>Project Scope</b>	<p>The Global Infrastructure Anti-Corruption Centre (GIACC) is an international, independent, not-for-profit organisation which develops and promotes anti-corruption measures for the infrastructure sector.</p> <p>GIACC believes that corruption can only be prevented and dealt with if both public and private sector organisations implement effective anti-corruption measures as a necessary and core part of their day-to-day corporate, procurement and project management.</p> <p>GIACC’s primary objectives are to:</p> <ul style="list-style-type: none"> <li>▪ raise awareness of corruption</li> <li>▪ develop and publish free resources which assist in understanding, preventing and dealing with corruption</li> <li>▪ promote the implementation of effective anti-corruption measures by governments, and by public and private sector organisations.</li> </ul> <p>GIACC achieves these objectives either itself, or through its growing network of Affiliates and Alliances.</p> <p>GIACC’s anti-corruption resources are applicable to all engineering, construction and infrastructure activities worldwide.</p>
<b>Achievements to Date</b>	<p>The GIACC Resource Centre (see menu on left for contents) provides, free of charge, online information, advice and tools designed to help organisations and individuals in the public and private sector understand, prevent and deal with corruption, including:</p> <ul style="list-style-type: none"> <li>▪ <b>Corruption information:</b> Analysis of <a href="#">what is corruption</a>; <a href="#">why corruption occurs</a>; <a href="#">how corruption occurs</a>; <a href="#">why avoid corruption</a>; <a href="#">liability for corruption</a>; <a href="#">cost of corruption</a> and hypothetical <a href="#">examples</a> of corruption.</li> <li>▪ <b>Anti-corruption education and training:</b> <ul style="list-style-type: none"> <li>• <a href="#">University Anti-Corruption Course</a></li> <li>• <a href="#">Online Anti-Corruption Training: Short Module</a> (available in English)</li> <li>• <a href="#">Online Anti-Corruption Training: Comprehensive Module</a> (available in English, Spanish, French, German, Italian, Polish and Romanian).</li> <li>• <a href="#">Anti-corruption training workshops</a></li> </ul> </li> <li>▪ <b>Anti-corruption programmes</b> for <a href="#">organisations</a>; <a href="#">governments</a>; <a href="#">funders</a>; <a href="#">project owners</a>; and <a href="#">professional institutions</a>.</li> <li>▪ <b>The Project Anti-Corruption System (PACS):</b> <a href="#">PACS</a> is a management system designed to assist in the prevention and detection of corruption on infrastructure projects.</li> </ul>

	<ul style="list-style-type: none"> <li>▪ <b>Anti-corruption measures:</b> Specific anti-corruption measures which an organisation can implement, either separately, or as part of an anti-corruption programme.</li> <li>▪ <b>Dealing with corruption:</b> Advice on how <a href="#">organisations</a>; <a href="#">individuals</a>; and the <a href="#">public</a> can deal with corrupt situations.</li> <li>▪ <b>Information</b> on anti-corruption <a href="#">conventions</a>; <a href="#">forums</a>; <a href="#">indices and surveys</a>; and <a href="#">initiatives</a>.</li> </ul>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>GIACC's resources are provided primarily for the assistance of all those involved in the infrastructure sector, including governments, project owners, funders, contractors, consulting engineering firms, and suppliers of equipment, materials and services. However, these resources can be adapted and used by public and private sector organisations and individuals in all sectors.</p> <p>GIACC provides the following free of charge anti-corruption training resources:</p> <ul style="list-style-type: none"> <li>▪ GIACC Online Anti-Corruption Training: Short Module</li> <li>▪ GIACC Online Anti-Corruption Training: Comprehensive Module</li> <li>▪ GIACC Anti-Corruption Training Manual.</li> </ul> <p>GIACC can also provide, upon request, anti-corruption training workshops. A fee will normally be charged for these workshops.</p> <p>These training resources focus on corruption in the infrastructure sector, but the principles described are applicable to all sectors.</p>
<b>Funding Available and Required</b>	Nil
<b>Other Resources Available and Required</b>	Nil
<b>Links for Further Information</b>	<a href="http://giaccentre.org">Training – resources – GIACC (giaccentre.org)</a>
<b>Other Relevant Information</b>	Nil

**PROPOSAL 8A: THE TECHNICAL CONSULTING CENTRE (TCC), A UNESCO CATEGORY II CENTRE FOR ENGINEERING EDUCATION, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, GHANA, A WFEO COLLABORATING ORGANISATION – PROJECT 1**

Project Title	<b>Enhancing Industrial Mechanics' Capacity to utilize CNC technologies in manufacturing to Safeguard Livelihoods</b>
Project Leader	Prof. Davis Francis
Relevant SDG	The relevant Sustainable Development Goal (SDG) for this project is SDG 9- Industry, Innovation, and Infrastructure. By providing training and resources to industrial mechanics in Suame Magazine, the project aims to enhance their capabilities through the adoption of Computer Numerical Control (CNC) technologies. This will promote innovation in the manufacturing sector and ensure access to modern and efficient infrastructure, aligning with SDG 9.
Project Scope	The project's scope is to support industrial mechanics in Suame Magazine, specialists in material removal processes, by introducing CNC technologies to their businesses. The traditional machining processes currently in use have limitations in achieving high precision and complex parts. The project seeks to address this issue by acquiring CNC machines (milling, lathe, and bending) and providing capacity-building training to the mechanics. By empowering them with CNC expertise, the goal is to enable them to stay competitive, protect their livelihoods, and retain high-paying jobs that would otherwise move to other cities with CNC technology firms. This proposal and scope satisfy the STI Strategy for Africa 2024 (STISA-2024) by building technical competencies in Africa. Upon successful implementation in Ghana, the activities will be expanded to two Anglophone Countries and One Francophone Country in the West Africa region.
Achievements to Date	The achievements to date include: Acquisition of CNC machines: TCC has successfully acquired CNC machines, including milling, lathe, and bending, which are strategically located at Suame Magazine's Intermediate Technology Transfer Unit. Identification of the issue: TCC has recognized the threat faced by industrial mechanics due to the shift towards CNC technologies and the migration of high-paying jobs to other cities
Proposed Method of Project Delivery and Schedule	To address the challenges faced by industrial mechanics and protect their livelihoods, the proposed method of project delivery is as follows: <u>Capacity Building:</u> TCC will provide comprehensive training and capacity building to the industrial mechanics in Suame Magazine. This training will cover CNC machine operation, programming, and design generation, enabling them to handle complex geometries and achieve high precision. <u>Operation Plan:</u> The project will work closely with the industrial mechanics to develop an effective operation plan that incorporates the use of CNC

	<p>technologies. This plan will ensure the smooth integration of CNC processes into their businesses.</p> <p><u>Resource Mobilization:</u> TCC will gather the necessary resources and support for acquiring CNC technologies.</p> <p><u>CNC Technology Adoption:</u> The project will assist the industrial mechanics in securing CNC machines for their businesses, putting them on par with modern digital developments and enhancing their competitiveness. The project will be implemented over a total estimated timeline of 24 months. It will begin with a preparatory stage (Months 1-2) to assess the skills of industrial mechanics and plan the capacity-building program. The capacity building (Months 3-8) phase will focus on training mechanics in CNC machine operation, programming, and design generation. Subsequently, an operation plan will be developed (Months 9-10) in collaboration with the mechanics, followed by resource mobilization (Months 11-12) to gather the necessary support and expertise for acquiring CNC technologies. Finally, the CNC technology adoption phase (Months 13-18) will assist mechanics in obtaining CNC machines, safeguarding their livelihoods and competitiveness. Monitoring and evaluation (Months 19-24) will ensure the project's success and impact on SDG 9 - Industry, Innovation, and Infrastructure</p>
Funding Available and Required	<p>No funding available</p> <p>An amount of USD 300,000 is required to carry out this next phase. (Training realization: \$260,000.00, Administrative and contingencies: \$40,000.00)</p>
Other Resources Available and Required	<p>\$100,000.00 has already been invested in the CNC Machines and Tools. (Cost account for CNC hydraulic folding machines, lathe, vertical machining centre, 3D printing, and plasma cutter)</p>
Links for Further Information	<p><a href="https://tcc.knust.edu.gh">https://tcc.knust.edu.gh</a> <a href="https://youtube.com/@KNUSTTechnologyConsultancyCent">https://youtube.com/@KNUSTTechnologyConsultancyCent</a> <a href="https://twitter.com/knusttcc">https://twitter.com/knusttcc</a>  <a href="https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/">https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/</a></p>
Other Relevant Information	<p>TCC was established in January 1972 with assistance from the Intermediate Technology Development Group Ltd. U.K, to serve as the interface between the research and development activities taking place at the University, and the entrepreneurial aspirations of the Ghanaian Public.</p> <p>The Technology Consultancy Centre (TCC), now UNESCO Category II Center of Excellence in Engineering Innovation, Manufacturing and Technology Transfer has as one of its cardinal objectives to promote modernisation and automation of indigenous manufacturing and industrial practices, using modern digital and smart technologies.</p> <p>The Centre seeks to strengthen and reinforce its existing technologies to develop expertise for Small and Medium Scale enterprises and artisans in the informal sector. Additionally, the Centre promotes collaboration with regional and international partners to achieve sustainable development and global citizenship targets, modernise indigenous technologies and build partnerships with regional and international partners to achieve sustainable development.</p>

**PROPOSAL 8B: THE TECHNICAL CONSULTING CENTRE (TCC), A UNESCO CATEGORY ii CENTRE FOR ENGINEERING EDUCATION, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, GHANA, A WFEO COLLABORATING ORGANISATION – PROJECT 2**

<b>Project Title</b>	<b>Enhancing Auto Mechanics' Capacity to Maintain Modern Automobiles to Safeguard Livelihoods</b>
<b>Project Leader</b>	Prof. Davis Francis
<b>Relevant SDG</b>	<p>The proposed project aligns with several Sustainable Development Goals (SDGs). It directly contributes to SDG 9 (Industry, Innovation, and Infrastructure), as it seeks to enhance the expertise, capacity, and resources of auto mechanics in the Suame Magazine Industrial cluster and the Kumasi metropolis.</p> <p>By providing training, tools, and a central auto lab, the project aims to improve the capabilities of mechanics and enable them to effectively service modern vehicles with advanced electronics systems. Additionally, the project indirectly contributes to SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth), as it helps protect the livelihoods of mechanics by ensuring their competitiveness and sustainability in the changing automotive industry.</p>
<b>Project Scope</b>	<p>The project involves establishing an auto diagnostic centre in collaboration with SMIDO (Suame Magazine Industrial Development Organization). The centre will serve as a shared resource hub, offering diagnostics support, advice, access to tools, and procurement services for modern diagnostic tools and vehicle electronic systems. It will also offer continuous training programs to improve the expertise and capacity of auto mechanics.</p> <p>Educational materials will be developed and made available through accessible media platforms, such as YouTube videos and online sites, targeting mechanics for easy access to relevant information. The centre will act as a help desk for vehicle owners seeking expert assistance and also organize workshops and seminars with industry experts. This proposal and scope satisfies the STI Strategy for Africa 2024 (STISA-2024) by building technical competencies in the Africa.</p> <p>Upon successful implementation in Ghana, the activities will be expanded to two Anglophone Countries and One Francophone Country in the West Africa region.</p>
<b>Achievements to Date</b>	<p>Since March 2023, the project has made significant progress. Five cohorts of 20 auto mechanics have already been trained in auto diagnosis, totalling 100 mechanics.</p> <p>This initial training is just the beginning, with plans to train at least 160 mechanics by the end of 2023. The collaboration with SMIDO, an organization representing various industry associations, has contributed to the successful implementation of the training program.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>The proposed project will be delivered through the establishment and operation of a central auto lab. The lab will be equipped with the necessary tools, human resources, and diagnostic systems to provide comprehensive support and training to auto mechanics. It will serve as a central hub for sharing resources, offering advice, and facilitating the procurement of diagnostic tools and electronic systems.</p> <p>The lab will also organize training programs, develop educational content, and act as a help desk for vehicle owners. Additionally, it will host workshops and seminars conducted by industry experts. The training program commenced in March 2023, and five cohorts, totalling 100 mechanics, have already been trained. The training program will continue, targeting the training of at least 160 mechanics by the end of 2023.</p> <p>The establishment and operationalization of the central auto lab, with all its functions and services, will be carried out concurrently with the ongoing training programs. A detailed schedule will be developed, ensuring a smooth progression of activities and timely implementation of the proposed project.</p>

	By focusing on building capacity, expertise, and resources, the project aims to support the auto mechanics and protect their livelihoods in the rapidly changing automotive industry. It seeks to empower mechanics with the necessary knowledge and tools while promoting continuous improvement and engagement with the latest developments.
<b>Funding Available and Required</b>	Funding required \$750,000.00 (Training realization: 600,000.00, Administrative cost: \$100,000.00) No current funding is available.
<b>Other Resources Available and Required</b>	\$300,000.00 dollars has been invested in equipment, tooling, and training.
<b>Links for Further Information</b>	<a href="https://tcc.knust.edu.gh">https://tcc.knust.edu.gh</a> <a href="https://youtube.com/@KNUSTTechnologyConsultancyCent">https://youtube.com/@KNUSTTechnologyConsultancyCent</a> <a href="https://twitter.com/knusttcc">https://twitter.com/knusttcc</a> <a href="https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/">https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/</a>
<b>Other Relevant Information</b>	<p>TCC was established in January 1972 with assistance from the Intermediate Technology Development Group Ltd. U.K, to serve as the interface between the research and development activities taking place at the University, and the entrepreneurial aspirations of the Ghanaian Public. TCC has over the years through its Intermediate Technology Transfer Unit (ITTU) has reached out to the ingenious community of practicing artisans, technicians, technologists and engineers within the sub-region with practical, but science-based solutions.</p> <p>The Technology Consultancy Centre (TCC), now UNESCO Category II Center of Excellence in Engineering Innovation, Manufacturing and Technology Transfer has as one of its cardinal objectives to promote modernisation and automation of indigenous manufacturing and industrial practices, using modern digital and smart technologies.</p> <p>The Centre seeks to strengthen and reinforce its existing technologies to develop expertise for Small and Medium Scale enterprises and artisans in the informal sector. Additionally, the Centre promotes collaboration with regional and international partners to achieve sustainable development and global citizenship targets, modernise indigenous technologies and build partnerships with regional and international partners to achieve sustainable development and global citizenship targets.</p>

**PROPOSAL 8C: THE TECHNICAL CONSULTING CENTRE (TCC), A UNESCO CATEGORY ii CENTRE FOR ENGINEERING EDUCATION, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, GHANA, A WFEO COLLABORATING ORGANISATION – PROJECT 3**

<b>Project Title</b>	<b>Women empowerment through modernisation of indigenous clean energy cooking utilising climate change adaptation materials</b>
<b>Project Leader</b>	Prof. Davis Francis
<b>Relevant SDG</b>	The relevant Sustainable Development Goal (SDG) for this project is SDG 7 - Affordable and Clean Energy. By providing clean cooking solutions that are energy-efficient, have almost zero emissions, and are made from sustainable materials, the project directly contributes to the promotion of clean and sustainable energy sources for households and institutions.
<b>Project Scope</b>	<p>The project's scope is to address the slow adaptation of clean cooking solutions in households and institutions by reevaluating the existing business model and value chain.</p> <p>The current approach of vertical integration has resulted in limited success due to challenges in cost, supply, and product quality. To overcome these barriers, the proposal aims to create a specialized and independent supply chain, with a focus on empowering women entrepreneurs. The supply chain will cover various stages, such as clay and additive supply, processing of clay for bricks or liners, supply of sheet metal and structural metals, forming and casting processes, assembly, marketing, distribution, installation, and servicing. By developing effective processes and technology, the goal is to increase productivity, drive down costs, create job opportunities, and serve a larger market.</p> <p>This proposal and scope satisfies the STI Strategy for Africa 2024 (STISA-2024) of innovation and entrepreneurship in the Africa. Upon successful implementation in Ghana, the activities will be expanded to two Anglophone Countries and One Francophone Country in the West Africa region. c) promoting</p>
<b>Achievements to Date</b>	<p>TCC has achieved significant progress in developing clean cooking solutions. The major achievements include (1). Development of energy-efficient clean cooking technologies:</p> <p>TCC has successfully developed clean cooking solutions that are energy-efficient, resulting in reduced fuel consumption and lower greenhouse gas emissions; (2). Use of sustainable materials: The centre has prioritized the use of sustainable materials in the production of clean cooking products, contributing to environmental conservation and reducing the reliance on non-renewable resources. Identification of challenges: TCC has identified the key challenges that hinder the mainstream adoption of clean cooking solutions, primarily related to the business model and the current vertical integration approach.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>To overcome the challenges and achieve significant adaptation of clean cooking solutions in households and institutions, the proposed method of project delivery is as follows:</p> <p>(1). Training women entrepreneurs: TCC plans to provide training and capacity-building opportunities for women entrepreneurs, enabling them to play a leading role in the specialized and independent supply chain;</p> <p>(2) <i>Redesigning the value chain</i>: Instead of the current vertical integration approach, the project will establish a specialized supply chain with independent businesses, each focusing on specific stages of the value chain, such as clay processing, metal supply, assembly, distribution, etc. The project will invest in research and development to create efficient and scalable processes and technology within each specialized segment of the supply chain.</p> <p>This will increase productivity and ensure high-quality products.</p>



	<p><i>Women empowerment.</i> By placing women at the forefront of the value chain, the project aims to empower them economically and socially, fostering gender equality and inclusive growth. Market expansion: With a specialized and independent supply chain, the project seeks to reach a wider market, making clean cooking solutions more accessible and affordable for households and institutions. The six-phase plan, spanning a total of 36 months, includes preparatory analysis (Months 1-3), capacity-building for women (Months 4-6), value chain redesign (Months 7-9), technology development (Months 10-15), implementation and market expansion (Months 16-24), and continuous monitoring for success in achieving SDG 7 - Affordable and Clean Energy.</p>
<b>Funding Available and Required</b>	<p>Funding required \$600,000.00 (Realization and training: \$510,000.00 and Administration and overheads: \$140,000.00) No funding currently available.</p>
<b>Other Resources Available and Required</b>	<p>\$100,000.00 has been invested in the cook laboratory prototypes, impact project and training programmes.</p>
<b>Links for Further Information</b>	<p><a href="https://tcc.knust.edu.gh">https://tcc.knust.edu.gh</a>  <a href="https://youtube.com/@KNUSTTechnologyConsultancyCent">https://youtube.com/@KNUSTTechnologyConsultancyCent</a>  <a href="https://twitter.com/knusttcc">https://twitter.com/knusttcc</a>  <a href="https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/">https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/</a></p>
<b>Other Relevant Information</b>	<p>TCC was established in January 1972 with assistance from the Intermediate Technology Development Group Ltd. U.K, to serve as the interface between the research and development activities taking place at the University, and the entrepreneurial aspirations of the Ghanaian Public. TCC has over the years through its Intermediate Technology Transfer Unit (ITTU) has reached out to the ingenious community of practicing artisans, technicians, technologists and engineers within the sub-region with practical, but science-based solutions.</p> <p>The Technology Consultancy Centre (TCC), now UNESCO Category II Center of Excellence in Engineering Innovation, Manufacturing and Technology Transfer has as one of its cardinal objectives to promote modernisation and automation of indigenous manufacturing and industrial practices, using modern digital and smart technologies.</p> <p>The Centre seeks to strengthen and reinforce its existing technologies to develop expertise for Small and Medium Scale enterprises and artisans in the informal sector. Additionally, the Centre promotes collaboration with regional and international partners to achieve sustainable development and global citizenship targets, modernise indigenous technologies and build partnerships with regional and international partners to achieve sustainable development and global citizenship targets.</p>

**PROPOSAL 8D: THE TECHNICAL CONSULTING CENTRE (TCC), A UNESCO CATEGORY ii CENTRE FOR ENGINEERING EDUCATION, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, GHANA, A WFEO COLLABORATING ORGANISATION – PROJECT 4**

<b>Project Title</b>	<b>Embracing Pozzolana: A Sustainable Solution for Reducing Climate Impact in Oil and Gas Cementing, Minimizing Reliance on Polluting Portland Cement and Bentonite Clay</b>
<b>Project Leader</b>	Prof. Davis Francis
<b>Relevant SDG</b>	<p>This project's relevant Sustainable Development Goal (SDG) is SDG 9, emphasizing Industry, Innovation, and Infrastructure.</p> <p>By exploring the use of pozzolana clay as a sustainable alternative to Portland cement and bentonite in oil and gas well drilling and cementing operations, the project contributes to innovative practices in the industry and aims to enhance infrastructure development while reducing its environmental impact</p>
<b>Project Scope</b>	<p>The scope of the use of pozzolana as a sustainable alternative in oil and gas well cementing project is to address the environmental concerns associated with the heavy reliance on Portland cement and bentonite clay in the oil and gas industry for Africa.</p> <p>The global cement industry is responsible for approximately 8% of the total global carbon dioxide emissions, contributing to climate change while bentonite contains heavy metals, which can pose environmental risks if not treated before disposal. In contrast, the abundance of cementitious clay resources across Africa is an untapped opportunity in the oil and gas industry. Despite this potential, there has been a significant gap in research regarding the suitability of pozzolana clay for use in oil well drilling and cementing operations.</p>
<b>Achievements to Date</b>	<p>TCC has a proven track record of excellence in technical assistance to improve competencies and promote standards in manufacturing and technology. The centre has prioritized the use of sustainable materials in contributing to environmental conservation.</p> <p>Based on this, initial results on blending pozzolana with Portland cement for the purpose of oil well cementing has shown improvements in free fluid reduction, plastic viscosity and compressive strength. It is therefore crucial to advance the potential benefit of the use of pozzolana in oil and gas operations to optimize the use of local resources and minimize the industry's environmental impact while creating jobs for women.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>To improve the sustainability of oil and gas drilling operation in Africa, the proposed method of project delivery will be:</p> <ol style="list-style-type: none"> <li>(1) Invest in research and development to optimise the chemical and physical properties of pozzolana clay during calcination for the purpose of oil well drilling operation – 1 to 6 months</li> <li>(2) Conduct fluid rheology, strength and other property testing to ensure the performance of pozzolana-based drilling fluids and cement – 6 to 12 months.</li> <li>(3) Implement and monitor the pozzolana-based drilling fluids and cement in pilot projects and actual oil and gas well drilling and cementing operations – 12 to 24 months.</li> <li>(4) Assess the economic feasibility and environmental benefits of adopting pozzolana in well drilling and cementing operations – 24 to 30 months.</li> <li>(5) Develop training programs and capacity-building initiatives for stakeholders in well drilling and cementing operations – 30 to 33 months.</li> <li>(6) Empowering women entrepreneurs by providing training opportunities to take leadership roles in the pozzolana-based supply chain in Ghana and across the sub region – 33 to 36 months</li> </ol>
<b>Funding Available and Required</b>	<p>Total Funding required \$1,000,000.00</p> <ol style="list-style-type: none"> <li>a. Personnel cost (\$350,000)</li> <li>b. Training tools Equipment and materials (\$280,000),</li> </ol>

	<p>c. Travel (\$50,000),  d. Publicity and Publications (\$20,000),  e. Participation of Trainees (\$40,000),  f. Administrative Cost (\$100,000).</p> <p>No funding currently available</p>
<b>Other Resources Available and Required</b>	
<b>Links for Further Information</b>	<p><a href="https://tcc.knust.edu.gh">https://tcc.knust.edu.gh</a>  <a href="https://youtube.com/@KNUSTTechnologyConsultancyCent">https://youtube.com/@KNUSTTechnologyConsultancyCent</a>  <a href="https://twitter.com/knusttcc">https://twitter.com/knusttcc</a>  <a href="https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/">https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/</a></p>
<b>Other Relevant Information</b>	<p>TCC was established in January 1972 with assistance from the Intermediate Technology Development Group Ltd. U.K, to serve as the interface between the research and development activities taking place at the University, and the entrepreneurial aspirations of the Ghanaian Public. TCC has over the years through its Intermediate Technology Transfer Unit (ITTU) at the Suame Magazine has reach out to ingenious and creative community of practicing artisans, technicians, technologists and engineers within sub-region with practical, but science-based solutions.</p> <p>The Technology Consultancy Centre (TCC), now Category II Center of Excellence in Engineering Innovation, Manufacturing and Technology Transfer under the auspices of UNESCO has as one of its cardinal objectives to promote modernisation and automation of indigenous manufacturing and industrial practices, using modern digital and smart technologies.</p> <p>The Centre also seeks to strengthen and reinforce its existing technologies to build a strong foundation ready for high growth for Small and Medium Scale enterprises and artisans in the informal sector. Additionally, the Centre will promote collaboration with regional and international partners to achieve sustainable development and global citizenship targets, modernise indigenous technologies and build partnerships with regional and international partners to achieve sustainable development and global citizenship targets.</p>

**PROPOSAL 8E: THE TECHNICAL CONSULTING CENTRE (TCC), A UNESCO CATEGORY ii CENTRE FOR ENGINEERING EDUCATION, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, GHANA, A WFEO COLLABORATING ORGANISATION – PROJECT 5**

<b>Project Title</b>	<b>Dealing with heavy metals in mine tailings and mined site-contaminated soil: An approach of integrated phyto and bioremediation (ROHMIBRA) Technology</b>
<b>Project Leader</b>	Prof. Davis Francis
<b>Relevant SDG</b>	<p>The relevant Sustainable Development Goal (SDG) for this project are 6, 12 and 15 with special emphasis on 6. SDG 6 (Clean water and sanitation) –</p> <p>Through the application of phyto and bioremediation techniques, heavy metals contaminants of polluted water bodies which serve as a source of drinking water for communities in which mining activities are carried out will be removed considerably, making these water resources safe for drinking, thus, reducing the risks of person contracting diseases. This will directly contribute to the target of improving water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials into water bodies.</p>
<b>Project Scope</b>	<p>The scope of the project is to assess and evaluate the impact of mining activities on the environment in Ghana. The mining industry in Ghana has significantly contributed to economic growth, but it has also resulted in severe environmental degradation, particularly in mine tailings and contaminated soil areas. Heavy metal contamination poses serious threats to ecosystems, human health, and agricultural productivity.</p> <p>The integrated phyto and bioremediation approach offers a sustainable and cost-effective solution to remediate these polluted sites. This research aims to address the pressing environmental concerns in Ghana, promote sustainable land management practices, and provide valuable insights into combating heavy metal pollution in mining regions. Success in this research can be replicated across the African region where mining activities have caused severe environmental problems affecting human life and natural resources.</p>
<b>Achievements to Date</b>	<p>So far TCC has been able to identify indigenous plant species such as (<i>Xylopia aethiopica</i> (Hwentia), <i>Pityrogramma calomelanos</i> (Fern), <i>Chromolaena odorata</i> (Acheampong weed), <i>Leucaena leucocephala</i> (Leucaena), <i>Terminalia superba</i> (Ofram) and microorganism capable of extracting/taking up heavy metal into their tissue from mine tailings and contaminated soil of mined sites.</p> <p>TCC has also identified key challenges associated with integrated phyto and bioremediation approach of removal of heavy metals from the environment which mainly has do with selecting the appropriate plant species and microorganism that will work symbiotically to extract heavy metals.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>In other to achieve success in this project, the duration of the study will be 36 months and in 4 stages covering the following activities:</p> <ol style="list-style-type: none"> <li>1. Site Selection (Months 1-3 months): Identify and select representative mine tailings and contaminated soil sites in different mining regions of Ghana.</li> <li>2. Experimental Design (Months 3 - 6): Establish controlled experiments to assess the effectiveness of integrated phyto and bioremediation techniques.</li> <li>3. Plant Selection (Months 6 – 9): Identify and select suitable hyper accumulator plant species native to Ghana that have demonstrated high metal-accumulating capabilities in previous studies.</li> <li>4. Microbial Strain Selection (Months 9 – 15): Identify metal-resistant and metal-transforming microbial strains that can form symbiotic relationships with selected plant species to enhance metal uptake and immobilization.</li> <li>5. Soil Amendments (Months 15 -18): Select appropriate soil amendments, such as compost and bio char, based on their ability to improve soil structure and support microbial activity.</li> </ol>

	<p>6. Field Implementation (Months 18 – 24): Prepare the selected sites by removing any debris or vegetation and loosening the soil to facilitate plant growth and root penetration.</p> <p>7. Data Collection (Months 24 – 27): Monitor heavy metal concentrations in soil and plant tissues at regular intervals throughout the study period.</p> <p>8. Data Analysis (Months 27 – 30): Analyse the collected data using statistical methods to evaluate the effectiveness of the integrated remediation approach.</p> <p>9. Monitoring and Adaptive Management (Months 30 – 36): Continuously monitor the progress of the remediation project and gather feedback from stakeholders.</p>
<b>Funding Available and Required</b>	<p>Total Funding required \$500,000.00</p> <p>a. Personnel Cost \$120,000.00,</p> <p>b. Laboratory Analysis/Consumables \$92,000.00,</p> <p>c. Fieldwork/travel and accommodation \$220,000.00</p> <p>d. Dissemination \$10,000.00,</p> <p>e. Indirect cost to Institution \$58,000.00</p> <p>No funding is currently available.</p>
<b>Other Resources Available and Required</b>	Access to equipment such HPLC, GC–MS, AAS at Environmental laboratory for the determination of heavy metal concentrations
<b>Links for Further Information</b>	<p><a href="https://tcc.knust.edu.gh">https://tcc.knust.edu.gh</a></p> <p><a href="https://youtube.com/@KNUSTTechnologyConsultancyCent">https://youtube.com/@KNUSTTechnologyConsultancyCent</a></p> <p><a href="https://twitter.com/knusttcc">https://twitter.com/knusttcc</a></p> <p><a href="https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/">https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/</a></p>
<b>Other Relevant Information</b>	<p>TCC was established in January 1972 with assistance from the Intermediate Technology Development Group Ltd. U.K, to serve as the interface between the research and development activities taking place at the University, and the entrepreneurial aspirations of the Ghanaian Public.</p> <p>This project falls within one of the core mandates of TCC, which is Knowledge Production, thus undertaking collaborative research to develop and transfer innovative engineering solutions and manufacturing technology for the sustainable development of the West Africa Sub-region and beyond.</p>

**PROPOSAL 8F: THE TECHNICAL CONSULTING CENTRE (TCC), A UNESCO CATEGORY ii CENTRE FOR ENGINEERING EDUCATION, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, GHANA, A WFEO COLLABORATING ORGANISATION – PROJECT 6**

<b>Project Title</b>	<b>Empowering Industrial Mechanics: Accessible CNC Technology for Enhanced Productivity and Quality Job Delivery.</b>
<b>Project Leader</b>	Prof. Davis Francis
<b>Relevant SDG</b>	The relevant Sustainable Development Goal (SDG) for this proposal is SDG 9 - Industry, Innovation, and Infrastructure. By empowering industrial mechanics with access to affordable CNC technology and enhancing their skills, the project directly contributes to promoting innovation in the manufacturing sector, advancing infrastructure, and fostering sustainable industrial growth.
<b>Project Scope</b>	<p>The project aims to address the challenge faced by industrial mechanics in adopting Computer Numerical Control (CNC) technology due to its high cost. The scope of the project includes developing a simple and highly functional CNC machine through the Technological Consultancy Centre's expertise and partnerships.</p> <p>Additionally, existing traditional machining technologies will be upgraded to become semi-automatic, enhancing precision and reducing human errors. The focus will be on providing accessible CNC technology to industrial mechanics to safeguard their businesses, improve work quality, and increase their competitiveness.</p>
<b>Achievements to Date</b>	<p>As of now, the Technological Consultancy Centre and its partners have made significant progress in amassing expertise in building numerical control systems, hardware, and design.</p> <p>The ongoing effort to develop a cost-effective and efficient CNC machine is underway. Additionally, work on transforming existing traditional machining technologies into semi-automatic systems with the integration of control systems is in progress, laying the groundwork for enhanced productivity and competitiveness.</p>
<b>Proposed Method of Project Delivery and Schedule</b>	<p>The project's delivery involves two main components:</p> <p><b>Development of Simple and Functional CNC Machines:</b> The Technological Consultancy Centre, in collaboration with partners, will focus on designing low-cost, user-friendly, and highly functional CNC machines tailored to the needs of industrial mechanics. These machines will improve precision, reduce human errors, and enhance overall productivity.</p> <p><b>Upgrading Traditional Machining Tools:</b> As part of the solution, traditional machining tools will be equipped with numerical control systems to make them semi-automatic. This transformation will enhance the capabilities of these tools, allowing mechanics to achieve higher-quality outputs and gain a competitive edge in the market.</p>
<b>Funding Available and Required</b>	<p>Funding required \$1,000,000.00 (Design: \$150,000.00, Materials, tools and equipment: \$550,000, Personnel (Center, consultant, training): \$150,000 and Administrative: \$100,000)</p> <p>No funding is currently available.</p>
<b>Other Resources Available and Required</b>	\$50,000.00 has been invested in the cook laboratory prototypes, impact projects and training programmes.
<b>Links for Further Information</b>	<p><a href="https://tcc.knust.edu.gh">https://tcc.knust.edu.gh</a>  <a href="https://youtube.com/@KNUSTTechnologyConsultancyCent">https://youtube.com/@KNUSTTechnologyConsultancyCent</a>  <a href="https://twitter.com/knusttcc">https://twitter.com/knusttcc</a>  <a href="https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/">https://www.linkedin.com/company/knust-technology-consultancy-centre-unesco-c2c/</a></p>
<b>Other Relevant Information</b>	TCC was established in January 1972 with assistance from the Intermediate Technology Development Group Ltd. U.K, to serve as the interface between the research and development activities taking place at the University, and

	<p>the entrepreneurial aspirations of the Ghanaian Public. TCC has over the years through its Intermediate Technology Transfer Unit (ITTU) has reached out to the ingenious community of practicing artisans, technicians, technologists and engineers within the sub-region with practical, but science-based solutions.</p> <p>The Technology Consultancy Centre (TCC), now UNESCO Category II Center of Excellence in Engineering Innovation, Manufacturing and Technology Transfer has as one of its cardinal objectives to promote modernisation and automation of indigenous manufacturing and industrial practices, using modern digital and smart technologies.</p> <p>The Centre seeks to strengthen and reinforce its existing technologies to develop expertise for Small and Medium Scale enterprises and artisans in the informal sector. Additionally, the Centre promotes collaboration with regional and international partners to achieve sustainable development and global citizenship targets, modernise indigenous technologies and build partnerships with regional and international partners to achieve sustainable development and global citizenship targets.</p>
--	---

**PROPOSAL 9: ROYAL ACADEMY OF ENGINEERING – AFRICA CATALYST - A WFEO COLLABORATING ORGANISATION**

<b>Project Title</b>	<b>Engineering education and training in Sub Saharan Africa</b>
<b>Project Leader</b>	Royal Academy of Engineering
<b>Relevant SDG</b>	4, 16, 17
<b>Project Scope</b>	Africa Catalyst aims to strengthen professional engineering bodies in sub-Saharan Africa so that they can effectively promote the profession, share best practice and increase local engineering capacity, to help drive development. Grants are awarded to professional engineering bodies in sub-Saharan Africa for projects ranging between six months and three years.
<b>Achievements to Date</b>	<p>Projects have been delivered in four Phases; Phase 4 projects concluded in May 2023 and include:</p> <ul style="list-style-type: none"> <li>- Association of Professional Women Engineers of Nigeria (APWEN) - She Engineer 30% Club</li> <li>- Federation of African Engineering Organisations (FAEO) - Catching them young through Sibho the Engineer</li> <li>- Ghana Institution of Engineering (GhIE) - Development of a framework for the establishment of a West African Engineering Professional Harmonisation and Accreditation Council (WAEPHAC)</li> <li>- Institution of Engineers Rwanda (IER) - Elevating the Eco-system of Engineering Sector in Rwanda</li> <li>- South Africa Road Federation (SARF) - Upskilling Female Civil En</li> <li>- Sierra Leone Institution of Engineers (SLIE) - Accredited Standards and Pathways for Professional Engineers (Sierra Leone),</li> <li>- South Africa Road Federation (SARF) - Upskilling Female Civil Engineers in local South African Municipalities</li> <li>- Uganda Institution of Professional Engineers (UIPE) - Strengthening Institutional Capacity to enhance Professional Development of Engineers in Uganda (SICEPDE)</li> <li>- Uganda Institution of Professional Engineers (UIPE) - Promotion and Strengthening of Diversity and Inclusion Activities within UIPE (Uganda)</li> </ul>
<b>Proposed Method of Project Delivery and Schedule</b>	It is expected that the Royal Academy of Engineering will propose similar projects based on the program sand structure established in Phases 1-4. Details are to be provided.
<b>Funding Available and Required</b>	To be advised
<b>Other Resources Available and Required</b>	To be advised
<b>Links for Further Information</b>	To be advised
<b>Other Relevant Information</b>	To be advised