



Population: 218.5 million (2022)

Research and development expenditures as a proportion of GDP : 0.13% (2007)

Researchers (in full-time equivalent) per million inhabitants : 39 (2007)

Scientific and technical journal articles: 7900 thousand (2020)

Source: World Bank Data 2023

NIGERIA Country Report 2023

Nigeria is Africa's biggest economy. Investment in higher education and research can be a catalyst for positive change and innovation. Moreover, Nigeria's participation in Rsif is advancing a Pan-African approach, internationalization and intra-Africa mobility.

Contribution to PASET-Rsif

Nigeria is one of the nine African countries that is contributing to the Regional Scholarship and Innovation Fund (Rsif) of the Partnership for skills in Applied Sciences, Engineering and Technology (PASET) since 2022 (Figure 1). Its contribution of USD 4 million is through the World Bank supported Africa Centres of Excellence for Higher Education for Development Impact (ACE Impact) project to train Nigerian PhD students in selected African host universities and collaborating with international partner institutions.

Through PASET-Rsif Nigeria is building strong institutions and future science leaders to drive a science and technology-led growth and development.

Why Rsif matters

- **High quality PhD training:** Combining intra-Africa academic exchange and international partnerships for world-class doctoral training.
- **Wider academic and research network:** Research placement at an advanced institution for exposure to cutting-edge technologies and connecting with global research networks.
- **Regional integration within Africa:** Strengthening centers of excellence and innovation ecosystems for benefit of the whole region.
- **Better economies of scale:** Pan-African partnerships, and a jointly pooled science fund professionally managed by the Rsif Regional Coordination Unit at *icipe*.

Rsif thematic areas



Rsif in Nigeria at a glance

41 Rsif PhD students hosted in Nigeria (11 nationalities, 41% women)

36 Nigerians awarded Rsif PhD scholarship (31% women)

47 Research publications

9 Rsif research and innovation projects

Rsif contributions (in mill. USD)

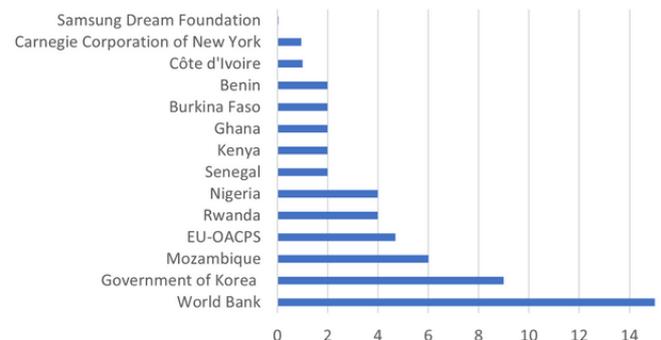


Figure 1: Rsif Contributing Countries and Partners

Strengthening research and innovation capacity in Nigeria

The African University of Science and Technology (AUST) in Abuja, Bayero University Kano (BUK) and University of Port Harcourt (UniPort) are among the 15 Rsif African Host Universities (AHUs) (Figure 2).

The Pan-African Materials Institute (PAMI) at AUST is hosting 14 Rsif funded PhD students (36% women, 4 nationalities). The Centre for Dryland Agriculture at BUK, PhD programme in Natural Resource Management and Climate Change is hosting 15 Rsif PhD students (67% women, 7 nationalities).

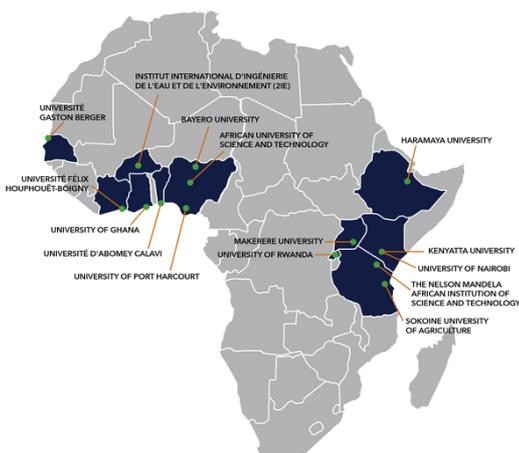


Figure 2: Rsif African Host Universities

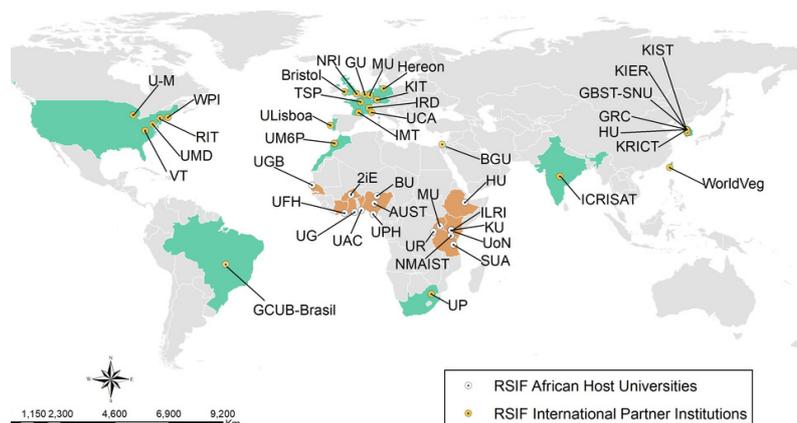


Figure 3: Rsif International Partner Institutions

Spotlight on Nigerian Rsif Scholars

Biocrude for renewable energy



Ishaq Kariim, Faculty in the Chemical Engineering Department at Federal University of Technology, Minna, Nigeria, is currently pursuing a PhD in Material Science and Engineering at the Nelson Mandela African Institution of Science and Technology (NM-AIST) in Arusha, Tanzania. His Rsif research placement is at the Korea Institute for Energy Research (KIER) (2023-2024).

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The study findings indicate the potential of the obtained biocrude as renewable energy sources upon further upgrading”

Ishaq Kariim, Rsif PhD Student

Research area: Performance investigation of hybrid catalysts for upgrading of biocrude derived from biomass into biojet fuel.

His research explores biocrude yield and energy composition. The efficient valorization of biomass for energy-derived biocrudes is essential for effective waste management. However, the production of biocrudes with high energy and reduced oxygen contents during the liquefaction process requires further insight. Therefore, the impact of reaction temperature, residence time, and ethanol: acetone on the energy compositions and bioproduct's yield enhancement were investigated.

The biocrudes obtained were characterized using elemental analysis, GC-MS, FTIR, GPC and TGA to understand the effects of process parameters on the biocrudes' compositions. An improved HHV (38.18 MJ/kg) and lower O/C ratio (0.11) were obtained at 430 °C, 35 min and 50% ethanol with a significant improvement in the enhancement factor, deoxygenation, and percentage hydrogenation of 2.63, 36.88%, and 77.87%, respectively. The presence of ketones, hydrocarbons, phenolics and aromatics of 23.74, 4.28, 37.20 and 17.81% respectively indicate the potential of the obtained biocrude as renewable energy sources upon further upgrading.

Investing in training and harnessing excellent science leaders have tangible socio-economic returns for the nation and continent at large

Baryte mineral liberation and recovery



Dr David Oluwasegun Afolayan

PASET-Rsif Alumnus. Graduated from African University of Science and Technology (AUST), Nigeria in 2021 where he is a resident faculty. Rsif Research placement at Worcester Polytechnic Institute, Boston, USA (2019-2020). Recipient of an Rsif Junior Investigator Research Award (US\$ 80,000).

Research area: Characterization of cleaved baryte surface-interfaces and computational study of interactions of baryte ore-based middling particles for enhanced mineral liberation and recovery.

Wastewater treatment in textile industry



Joshua Ayetade

Faculty, Federal University of Technology Akure. Rsif PhD student in Material Science and Engineering at the Nelson Mandela African Institution of Science and Technology (NM-AIST).

Research placement at Ghent University, Belgium (2024).

Research area: Development of Nano-Size Doped Polyaniline Composites for Catalytic Degradation of Selected Industrial Azo Dyes.

Controlling gas hydrate formation in oil and gas industry



Fawziyah Oyefunke Olarinoye

Rsif PhD student Petroleum and Gas Engineering / Energy Economics at University of Port Harcourt, Nigeria.

Research placement at Korea Institute of Energy Research (KIER), Korea (2022-2023).

Research area: Agro-waste based amino acids as kinetic hydrate inhibitors.

Hydrogel electrolytes for high performance batteries



Nkechi Elizabeth Offia-Kalu

Faculty, Federal University of Technology Owerri Imo State, Nigeria. Rsif PhD student at African University of Science and Technology (AUST), Nigeria.

Research placement at Worcester Polytechnic Institute, Boston, USA (2024)

Research area: Sustainable Hydrogel Nanocomposites Electrolytes Capable of Suppressing Dendrites for High-Performance Zinc-Air Batteries.

Rsif awards competitive research and innovation grants that complements the PhD training at African universities by supporting research that promotes scientific excellence and use of knowledge for sustainable development impact.

Strengthening the university innovative potential



Photo: Professor Jibrin Mohammed Jibrin

Bayero University Kano has successfully strengthened the innovative potential of the university to stimulate the development of technological innovations and encourage research commercialization of novel ideas, services, products by faculty and students in collaboration with private sector.

Through the project, more than 600 faculty and students were trained on intellectual property management, industry collaboration strategies, and research commercialization approaches. This was a significant step towards nurturing a culture of innovation and entrepreneurship through the University's Directorate for Research, Innovation, and Partnership (DRIP).

Consequently, the university has established a dedicated Directorate for Entrepreneurship, which will support faculty and students' efforts on technology transfer and commercialization of research outputs. This is now possible with updated policies for recognizing and rewarding excellence in research and innovation at the university as well as policies for technology transfer as guided by the National Office for Technology Acquisition and Promotion (NOTAP)

The grants also laid the foundation for the establishment of an agri-business Regional Innovation and Entrepreneurship Accelerator known as "RITEH" in partnership with ICRISAT.

Project title: Initiatives for Sustainable Food Security Innovations in the Drylands (ISFoSID)

Project leader: Professor Jibrin Mohammed Jibrin, Director Center of Excellence for Dryland Agriculture (CDA), Bayero University, Kano

Partners: The Manufacturers Association of Nigeria (MAN), Dala Foods Nigeria Limited and the International Crops Institute for the Semi-Arid Tropics (ICRISAT).

The university has allocated land for constructing the hub, which is currently in progress funded by the World Bank supported ACE Impact project. RITEH hub will serve as a platform for continued training on entrepreneurship, mentorship, and incubation of startups by faculty and students.

The university now has active collaborations innovation hubs in the region, such as OPOLO, INNOV 8, ICRISAT hub and Abuja Technology Village, which collaborate on issues such as guest lectures, research and innovation fairs and innovation pitching competitions.

Although there have been some sporadic activities on entrepreneurship and innovation in the University in prior periods, the implementation of the Rsif innovation funded ISFoSID project has brought remarkable changes to the university's innovation ecosystem.



Photo: A Sensitization workshop on product and services standardization was held on 28 April 2023.



Contact us

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