



**KENYA**

Population: 54 million (2022)

Research and development expenditures as a proportion of GDP : 0.69% (2010)

Researchers (in full-time equivalent) per million inhabitants : 227 (2010)

Scientific and technical journal articles: 1753 thousand (2020)

Source: World Bank Data 2023

# KENYA

## Country Report 2023

Kenya is the leading economy in East Africa. Its economic performance strengthened in 2023 despite challenges with inflation. The World Bank projected GDP growth of 5% p.a. in 2023, and this upward growth trajectory is expected to continue in 2024. Kenya's consistent investment in human capital and higher education is contributing to its growth aspirations. It is paving the way for a skilled labour force that is contributing to sustainable inclusive growth, job creation and socio-economic transformation.

### Contribution to PASET-Rsif

Kenya 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 2017 (Figure 1). Its contribution is USD 2 million to train Kenyan PhD students in selected African host universities and collaborating with international partner institutions.

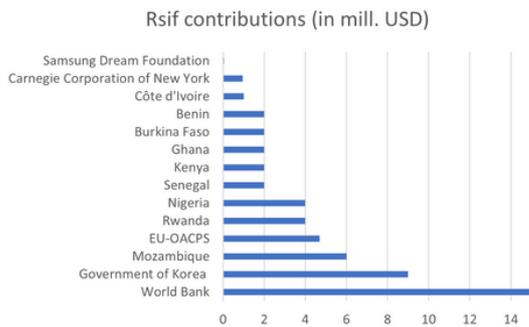


Figure 1: Rsif Contributing Countries and Partners

Through PASET-Rsif Kenya is building strong institutions and future science leaders to drive a science and technology-led growth and development. Kenya is the former chair of PASET and hosts the International Centre for Insect Physiology and Ecology (*icipe*), which is serving as the Rsif Regional Coordination Unit.

### Rsif thematic areas



### Rsif in Kenya at a glance

- 37** Rsif PhD students hosted at University of Nairobi and Kenyatta University (14 nationalities, 38% women)
- 25** Kenyans awarded Rsif PhD scholarship (68% women, 3 who graduated)
- 55** Research publications
- 9** Rsif research and innovation projects (totaling US\$ 679,253) awarded to faculty in Kenyan universities

### 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*.

## Strengthening research and innovation capacity in Kenya

The University of Nairobi (UoN) and Kenyatta University (KU) are two of the 15 Rsif African Host Universities (Figure 2).

The PhD programme in Physics at UoN, is hosting 28 Rsif funded PhD students (39% women, 12 nationalities) and the PhD programme in Material Science at KU is hosting 9 Rsif funded PhD students (33% women, 8 nationalities).

UoN and KU benefit from linkages with other African universities as well as the Rsif international partner institutions for the Rsif 'sandwich' programme where students spend 6-12 months at an advanced institution conducting collaborative research (Figure 3).

Rsif also provided video-conferencing equipment, facilities for e-learning and access to a wide range of scientific journals to the university library and its students.

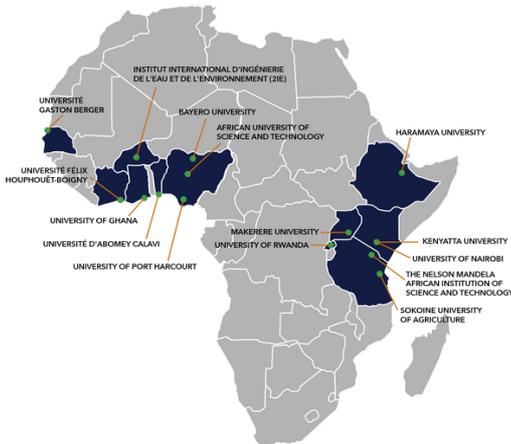


Figure 2: Rsif African Host Universities

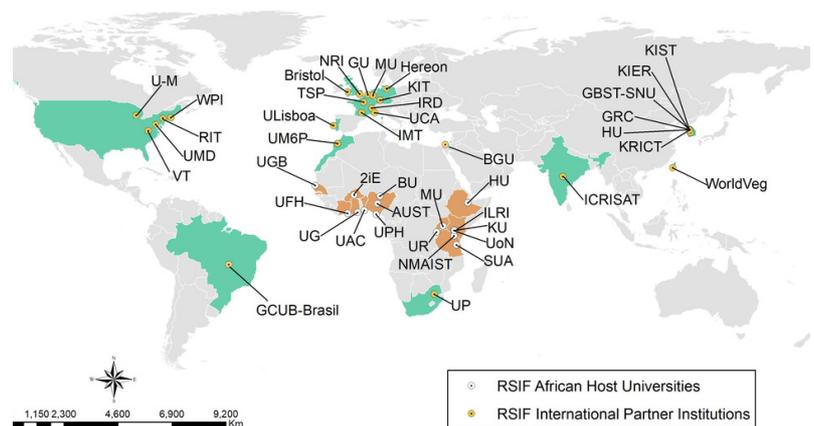


Figure 3: Rsif International Partner Institutions

## Spotlight on Kenyan Rsif scholars

### Accelerating the commercialization of low-cost solar cell technologies



**Dr Richard Koech.** PASET- Rsif alumnus.

Lecturer at Moi University, Eldoret. Graduated from the African University of Science and Technology (AUST), in Abuja, Nigeria in 2021. Research placement at Worcester Polytechnic Institute in Boston, USA.

Recipient of an Rsif Junior Investigator Research Award (US\$ 80,000)

Research area: Additive-assisted Fabrication of Efficient and Stable Perovskite Solar Cells

The emerging photovoltaic technology based on perovskite solar cell (PSC) is the best candidate to develop affordable and sustainable energy systems if only the non-radiative recombination power loss and performance degradation problems can be addressed. Engineering the properties of the different components of PSC has been shown to be instrumental in reducing recombination and performance degradation routes that limit their power conversion efficiency (PCE) and lifetime. Specifically, the incorporation of some additives into the absorber (perovskite) layer has been shown to be effective in modulating its nucleation and crystallization dynamics which eventually improve its bulk and surface properties and consequently the overall performance of PSCs.

This project studies the effects of some local plant-derived antioxidant compounds; when used as additives in perovskite precursors; on the power conversion efficiency and stability of perovskite solar cells. The project team is composed of researchers with physics, chemistry and material science background who work on extracting antioxidant compounds from some local plants, testing their antioxidant activities, and incorporating them in PSCs so as to assess the impact on their performance.

The research findings are expected to provide a leeway to advance the performance and stability of perovskite solar cells thus contribute to accelerating the commercialization of low cost solar cell technologies leading to increased access to affordable energy by the population especially low-income earners.

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

## Blue Economy



**Dr Sylvia Wairimu Maina**

PASET-Rsif alumna. Currently a lecturer at Mt. Kenya University, Kenya. Graduated from Sokoine University of Agriculture, Tanzania in 2023. Rsif research placement at the Korea Institute of Science and Technology (KIST) (2019-2021) with support from the Samsung Dream Scholarship Foundation.  
[Recipient of an Rsif Junior Investigator Research Award \(U\\$80,000\)](#)

**Research area:** Innovative steps for utilizing seaweeds along Kenya's coast as a source of sustainable food and health-promoting bioactive components.

## Novel diagnostics for maize



**Faith Njeri Njeru**

Rsif PhD student in Life and Environmental Sciences at Sokoine University of Agriculture, Tanzania. Research placement at Ghent University, Belgium.

Recipient of a 2023 L'Oréal-UNESCO For Women in Science Sub-Saharan Africa Award for Developing novel diagnostics to conserve Kenya's maize crops.

**Research area:** Application of nanobody as a diagnostic tool and their antiviral properties against Maize lethal necrosis

## Solar Energy Solutions



**Mwende Mbilo**

Rsif PhD student in Physics at University of Nairobi, Kenya. Research placement at Korea Research Institute of Chemical Technology (KRICT) (2022-2023).

Recipient of a 2023 L'Oréal-UNESCO For Women in Science Sub-Saharan Africa Award for Innovating Science to improve solar energy solutions in Kenya

**Research area:** Design of efficient and stable non-fullerene acceptor-based organic solar cells by buffer layer modification.

## Water treatment



**Bethwel Kipchirchir Tarus**

Rsif PhD student in Material Science at Nelson Mandela African Institution of Science and Technology, Tanzania.

Research placement at Korea Institute of Science and Technology (KIST), Korea.

**Research area:** Brackish Water Desalination by Capacitive Deionization using Beaded Electrospun Carbon Nanofibers

**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.**

## Unlocking a market for seaweed and banana fibre while addressing period poverty and pollution



Photo: One of the KU students on the project team explains and show samples to a delegation from PASET-Rsif, World Bank and the Government of Kenya during a visit on 28 March 2023.

Female sanitary towels are a major contributor to plastic waste globally due to petrochemical by-products used in making hydrogel (a super absorbent gel) and the plastic cover at the base of the sanitary towel. There is limited research that has addressed the scope of this problem in Africa despite the increasing sanitary waste dumped in garbage landfills every month in most urban centers.

This research adopts a multidisciplinary approach and develop prototypes of biodegradable sanitary towels using cellulose from seaweed and banana stems. The project does this by integrating design thinking, innovation, human-centered and value addition-oriented approaches.

**Project title:** Enhancing Biodegradable Sanitary Towel Production through Utilization of Seaweed and Banana Pseudo stem Residues: A Value Addition Strategy

**Project leader:** Dr. Jacqueline Kisato, Kenyatta University

**Partners:** Jomo Kenyatta University of Agriculture and Technology and Busitema University, Uganda

Thanks to the funding provided by the Government of Korea to PASET-Rsif for competitive research and innovation grants through *icipe*, Dr. Kisato and her team was able to get support to build on another research project funded by the National Research Fund of Kenya.

The biodegradable sanitary towels prototypes from the project will help mitigate micro plastic environmental pollution, enhance knowledge and scholarship in the sea weed/ banana value chains and create new entrepreneurial opportunities to address micro-plastic pollution due to sanitary towel waste disposal in landfills across urban areas in Kenya, Uganda and beyond. The promising project findings has been featured in the Nation - [link](#).



Photos: a) Pre-market survey during sea weed collection at Kibuyuni, Kwale county (b) sea weed collection (c) drying of sea weed at Kenyatta University before grinding at JKUAT.



### Contact us

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