



Rsif in Mozambique



Research. Innovate. Transform Africa

The PASET-Regional Scholarship and Innovation Fund for Applied Sciences, Engineering and Technology in Mozambique



Rsif - Designed for Impact

Flagship project of PASET



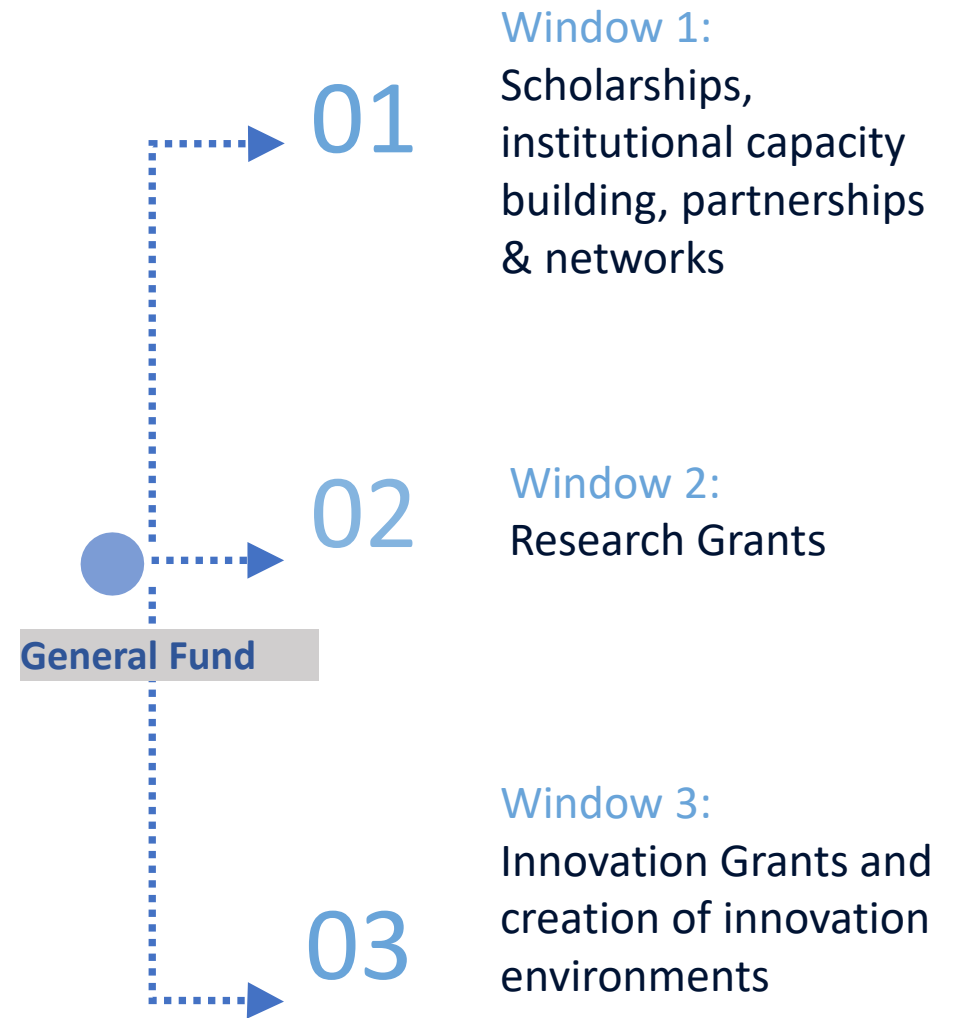
Building sustainable doctoral training, research and innovation ecosystems for development in Africa

Objectives

— Create a stock of highly skilled scientists, professionals and innovators in applied sciences, engineering and technology (ASET) areas

— Address imbalances in the number of women and disadvantaged groups in ASET fields in Africa

— Build African university capacity to provide relevant ASET training

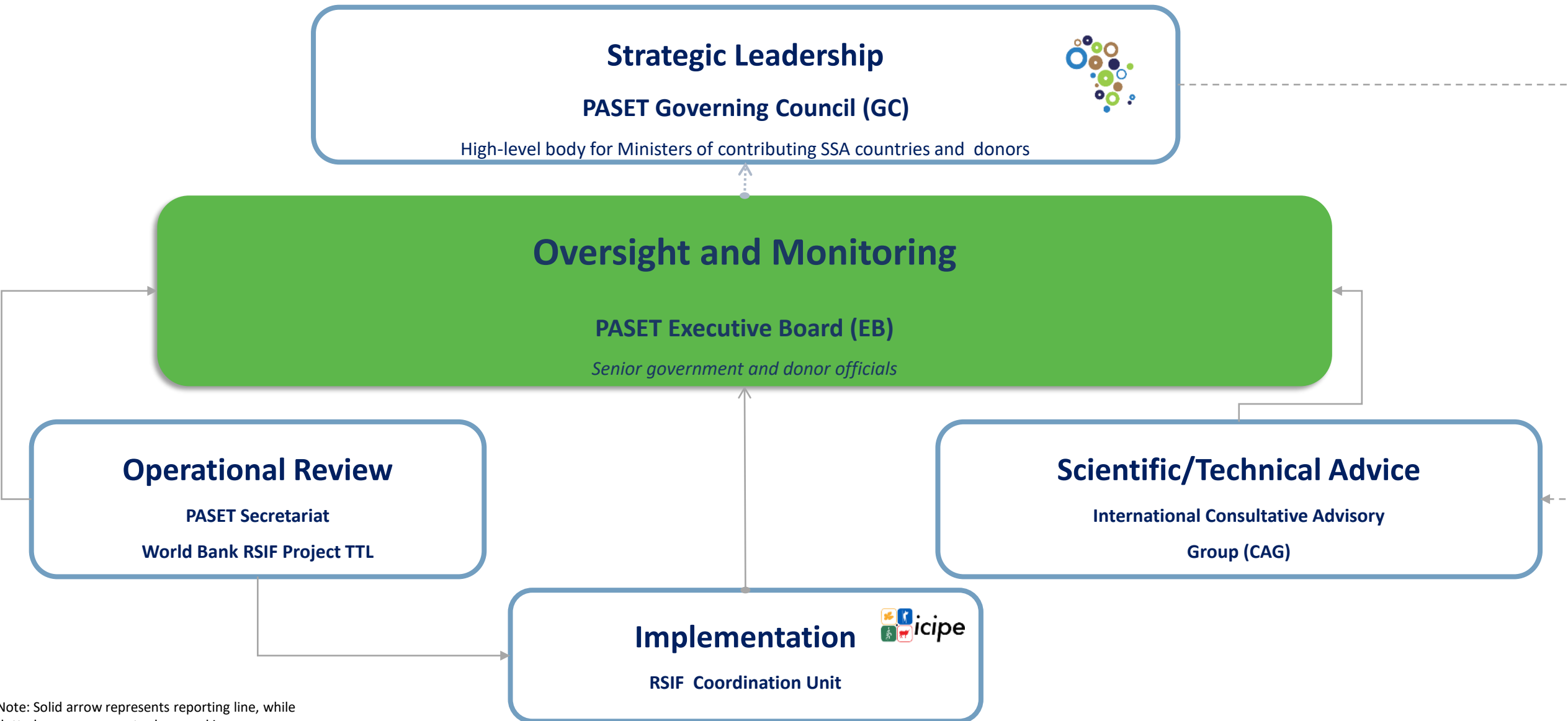


Rsif is a unique African initiative

1. Owned and managed by African governments through PASET (11 African governments)
2. To-date, investments from 9 African governments (between US\$1 -6 million each), the World Bank, Korea and other funders
3. Managed by an African led international research/innovation and training institution – *icipe*
4. Regional approach to grow Africa's STI agenda
5. Sustainability - vision to grow Rsif into a Pan-African science fund
 - establish a Permanent fund
 - exploring innovative financing and leveraging of private capital, e.g. blockchain technology, carbon credit, venture capital fund.



Inclusive, Efficient and Transparent Governance



Note: Solid arrow represents reporting line, while dotted arrow represents close working relationship

icipe Rsif - Fostering Excellence

- Highly Competitive Selection
- Ongoing Mentoring

- Selective Matching
- High Level of Interaction



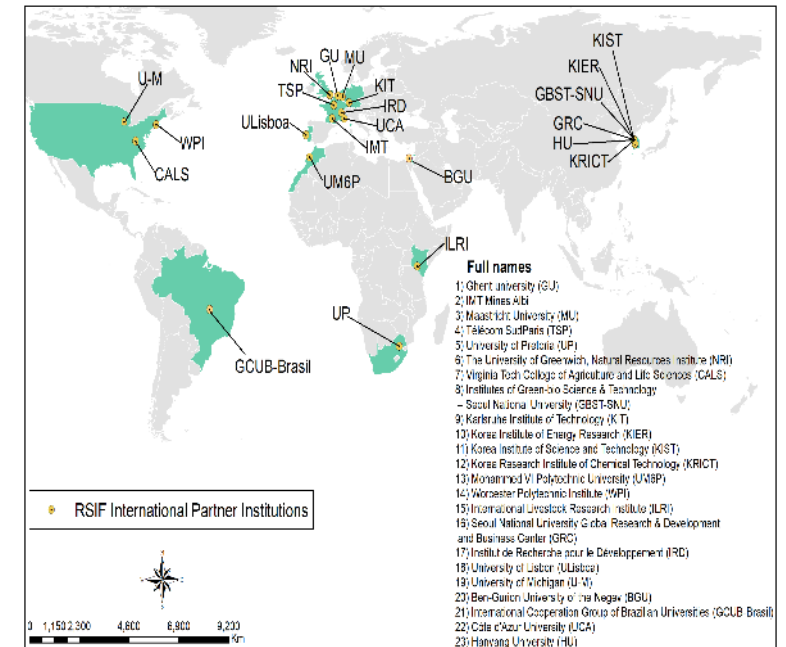
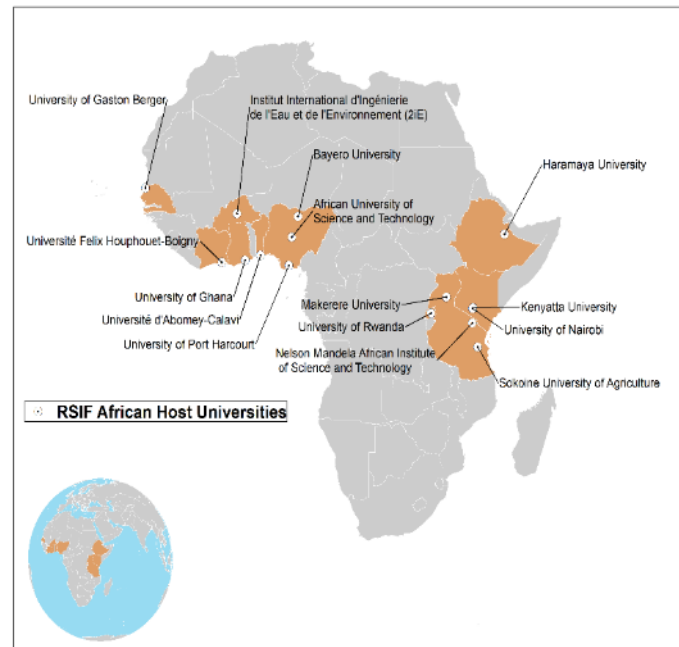
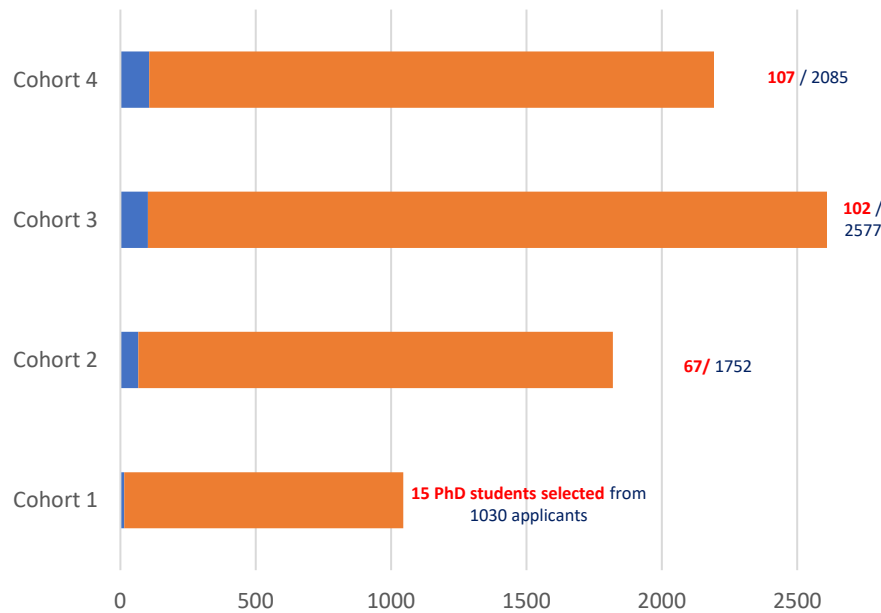
291 PhD Scholarships



15 African Host Universities
(4 AHUs admit first Rsif students in 2022)



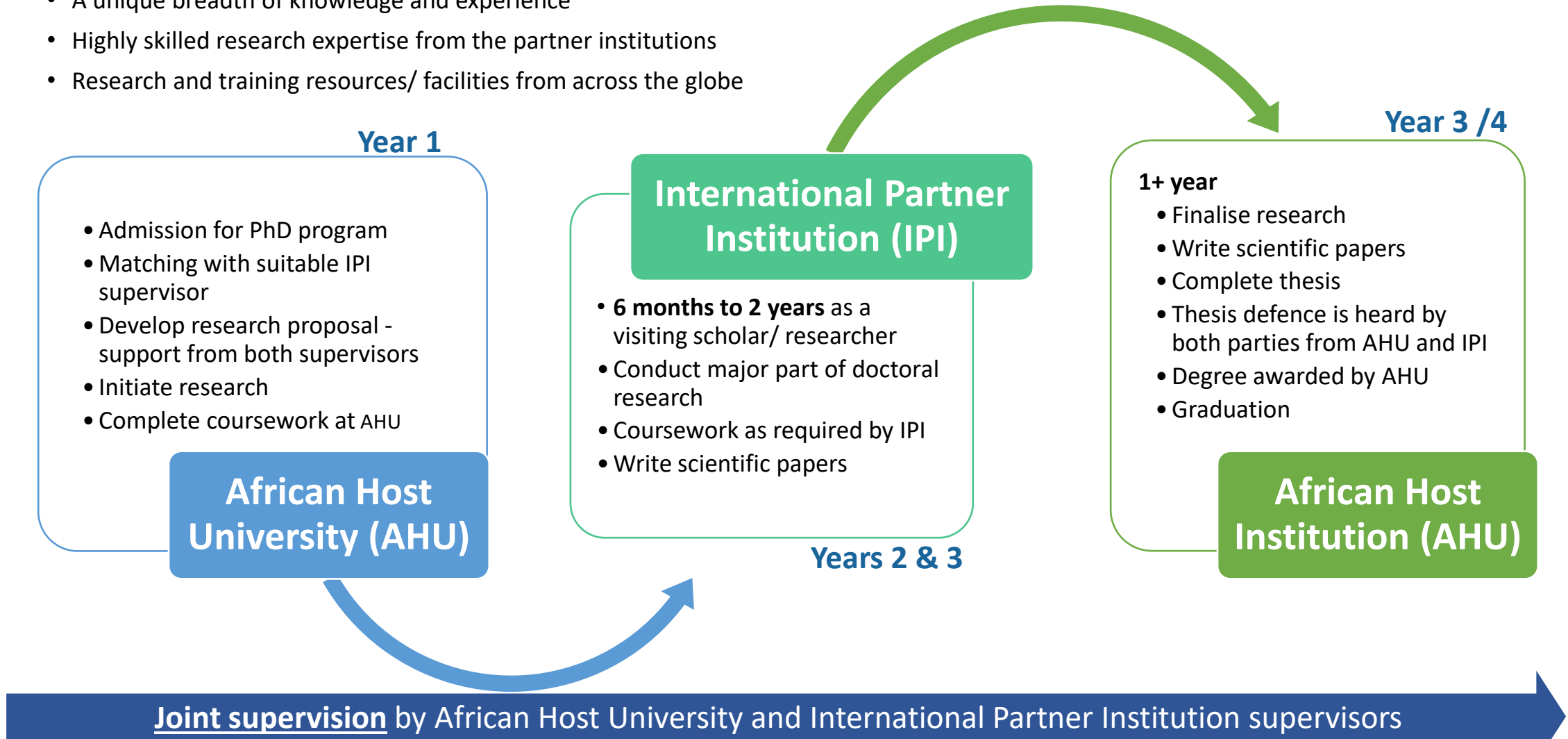
23 International Partner Institutes/universities



Rsif PhD Sandwich Model

Enables scholars and faculty members access to:

- A unique breadth of knowledge and experience
- Highly skilled research expertise from the partner institutions
- Research and training resources/ facilities from across the globe



Rsif and Mozambique

- Mozambique is a member of PASET
 - Participates in PASET Executive Board – Dr. Vitoria Langa de Jesus, Executive Director, Mozambique National Research Fund
- Investments in Rsif in pursuit of common agenda:
 - accelerating high quality PhD training
 - strengthening capacity for innovative research and respond to African challenges
- Significant benefits to Mozambique higher education, research and innovation ecosystem
- Mozambique invested US\$ 6 million in Rsif in 2020 (MozSkills component 1)



Photo: H.E. Prof. Daniel Daniel Nivagara, Minister of Science, Technology and Higher Education, speaking at the RSIF/MozSkills Results Sharing Seminar in Maputo on 14 October 2022

Seminário de Partilha de Resultados: PASET-R e FDI no âmbito do Projeto MozSkills



Rsif/MozSkills

32 Mozambican PhD scholars and 12 grants ongoing

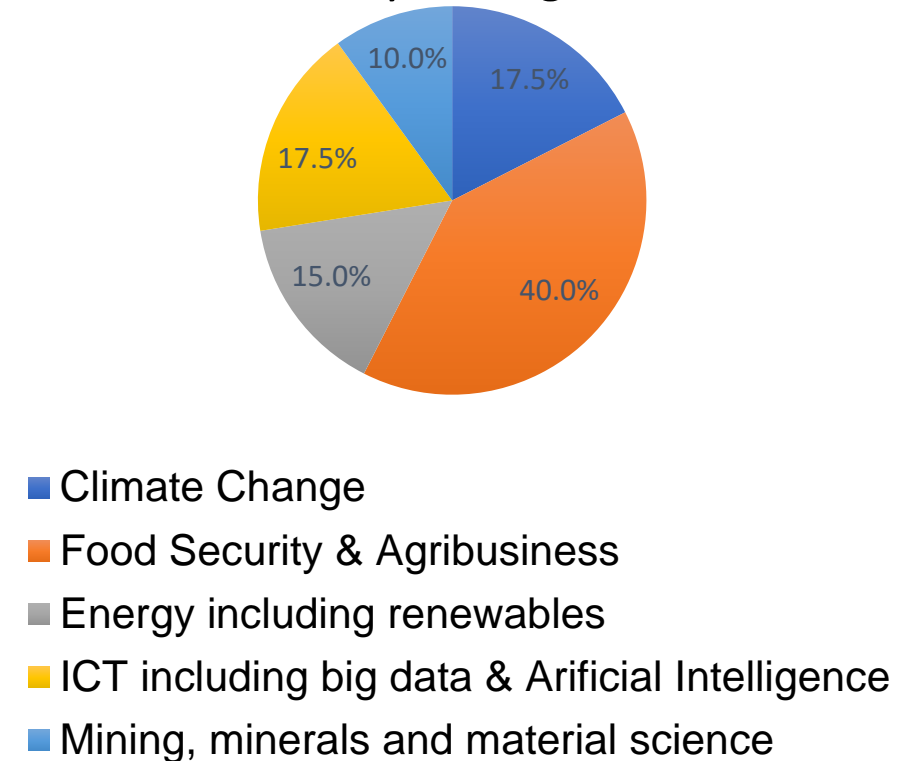
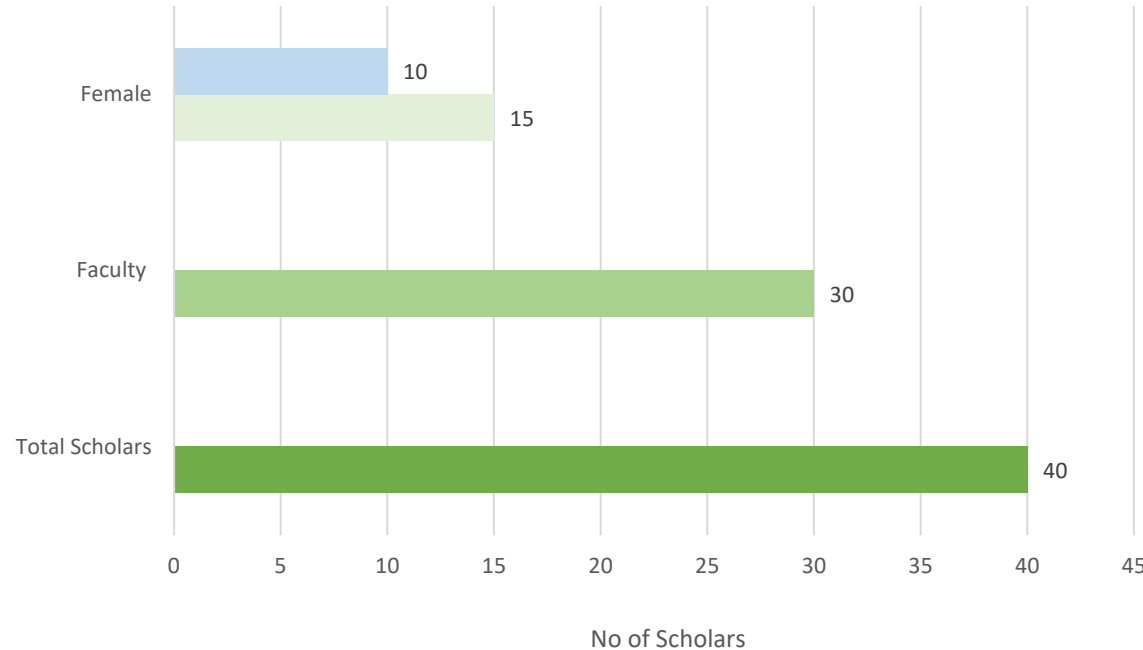


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40 Mozambique funded PhD Scholarships

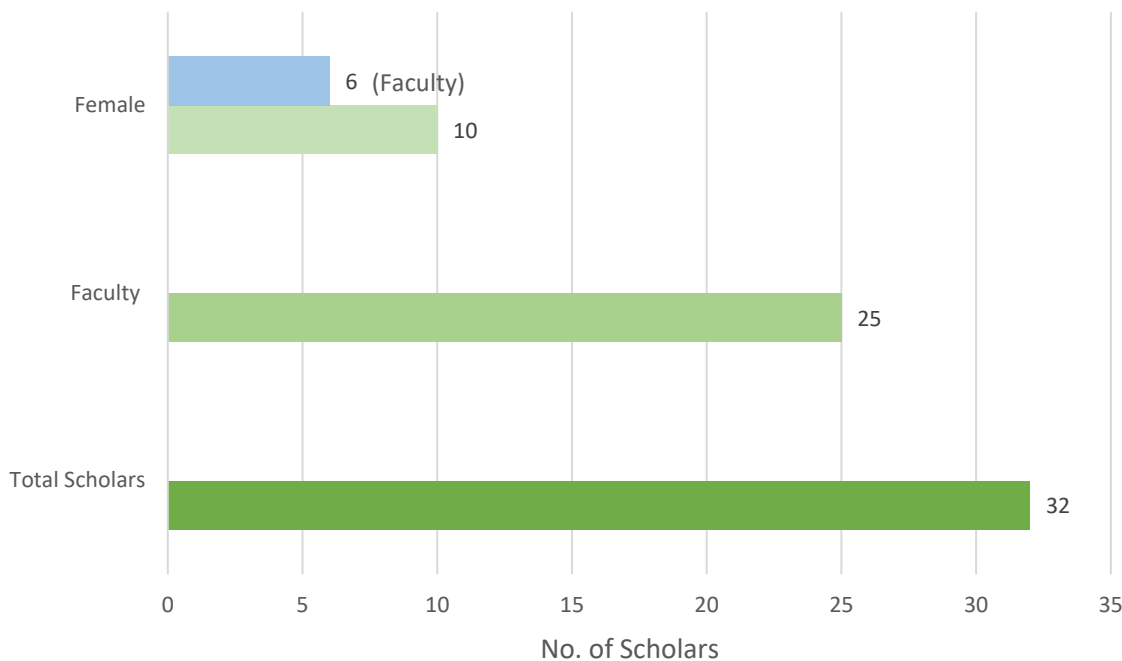


- 40 Mozambique funded RSIF doctoral scholars (40% women and 75% Faculty)
 - 32 scholars from Mozambique
 - 8 scholars from 7 other nationalities benefit from scholarships
- 15 RSIF scholarships awarded in 1st round; and 25 awarded in 2nd round call.
- Spread across all five themes with highest share in food security and agribusiness



Mozambican PhD Students Overview

- 32 Mozambican Rsif doctoral scholars (31% women and 78% faculty)
- Scholars registered in 10 competitively selected Rsif African Host Universities (AHUs)



| Thematic area | African Host University | Scholars |
|---|--|----------|
| Climate Change | Bayero University Kano, Nigeria | 3 |
| | Haramaya University, Ethiopia | 3 |
| Energy including renewables | 2iE, Burkina Faso | 1 |
| | University of Nairobi, Kenya | 4 |
| Food Security and Agribusiness | Makerere University, Uganda | 4 |
| | Sokoine University of Agriculture, Tanzania | 8 |
| | University of Ghana | 1 |
| Minerals, Mining and Materials Engineering | Nelson Mandela African Institution of Science & Technology, Tanzania | 2 |
| ICTs including Big Data & Artificial Intelligence | University of Gaston Berger, Senegal | 2 |
| | University of Rwanda | 4 |

Climate Change

| No | Name | Nationality | Gender | African Host University (AHU) | Research topic | Status |
|----|---------------------------------------|-------------|--------|---------------------------------|---|-----------------|
| 1 | Rafael Francisco Nanelo | Mozambique | Male | Bayero University Kano, Nigeria | Sustainable production practices as an element to mitigate the effects of climate change in the semiarid region | At BUK, Nigeria |
| 2 | Teofilo Damiao Nhamuhuco | Mozambique | Male | Bayero University Kano, Nigeria | Evaluation of the effects of tropical cyclones Ana and Gombe on the mangrove ecosystem. | At BUK, Nigeria |
| 3 | Paulo Ester Da Conceicao Foguete Goba | Mozambique | Male | Bayero University Kano, Nigeria | Contribution of Non-Timber Forest Products (NTFP) to livelihood and the ecological implication of its exploitation in Magoe National Park, Mozambique | At BUK, Nigeria |
| 4 | Heraclito Rodrigues Comia | Mozambique | Male | Haramaya University, Ethiopia | Environmental Capacity building on Climate Change and Disaster management in Mozambique | At HU, Ethiopia |
| 5 | Janete Mutualbo Americano | Mozambique | Female | Haramaya University, Ethiopia | Development of a model for the quantification of soil fertility parameters, through Mid-Infrared Spectroscopy and Remote Sensing in acid and alkaline soils in central Mozambique | At HU, Ethiopia |
| 6 | Rodolfo Bernardo Chissico | Mozambique | Male | Haramaya University, Ethiopia | Environmental monitoring of pesticide use in agriculture using bioindicators | At HU, Ethiopia |
| 7 | Charles Lwanga Twagiramungu | Rwanda | Male | Haramaya University, Ethiopia | Designing a Biochar from plant-based biomass for purposes of improving soil properties and reducing greenhouse gas emissions from the soil | At HU, Ethiopia |

Meet Janete Mutualbo Americano



- **African Host University:**
Haramaya University, Ethiopia
- **PhD programme:**
Climate Smart Agriculture
- **Research topic:**
Development of a model for the quantification of soil fertility parameters, through mid-infrared spectroscopy and remote sensing in acid and alkaline soils in central Mozambique
- Presented at RSIF/MozSkills Results Sharing Seminar in Maputo on 14-Oct-22

Food Security and Agribusiness - 1

| No | Name | Nationality | Gender | African Host University | Research Topic | Status |
|----|-----------------------------------|-------------|--------|---|---|------------------|
| 1 | Antonio Daniel Pedro Maquil | Mozambique | Male | Makerere University, Uganda | Election of manioc genotypes (Manihot Esculenta Crantz) based on multiple characteristics for different uses in Mozambique | At MUK, Uganda |
| 2 | Aurelio Salvador Macaringue | Mozambique | Male | Makerere University, Uganda | Identifying natural genetic variation to combined heat and drought stress in wheat landraces. | At MUK, Uganda |
| 3 | Norberto Jose Palange | Mozambique | Male | Makerere University, Uganda | Enhancement of Zea mays Nutritional Quality and Grain Growth by Activation of Biochemical Mechanisms using CRISPR/Cas9 | At MUK, Uganda |
| 4 | Stelio Boaventura Paulino Nuvunga | Mozambique | Male | Makerere University, Uganda | Effects of degraded soil recovery methods for rice production at Chòkwé Irrigation System | At MUK, Uganda |
| 5 | Angelica Adiacao Jossefa | Mozambique | Female | Sokoine University of Agriculture, Tanzania | Microbiological analysis in vegetables cultivated with tilapia contaminated by bacteria in aquaponic systems | At SUA, Tanzania |
| 6 | Carlos Tancredo Jose | Mozambique | Male | Sokoine University of Agriculture, Tanzania | Cowpea agronomic biofortification with iron and zinc and value chain strengthening and food and nutrition security in Sub-Saharan Africa. | At SUA, Tanzania |
| 7 | Hercidio Jaime Tandane | Mozambique | Male | Sokoine University of Agriculture, Tanzania | Impact of agribusiness on food security and livelihood generation: A case study in Singida, Tanzania | At SUA, Tanzania |
| 8 | Ibraimo Teleha Chabite | Mozambique | Male | Sokoine University of Agriculture, Tanzania | Microbiological and physicochemical evaluation on food safety in post-harvest management in northern Mozambique | At SUA, Tanzania |

Food Security and Agribusiness - 2

| No | Name | Nationality | Gender | African Host University (AHU) | Research Topic | Status |
|----|--------------------------|-------------|--------|---|---|---------------------------|
| 9 | Leonildo dos Anjo Viagem | Mozambique | Male | Sokoine University of Agriculture | Study of the Microbiome and Evolution of Genes Associated with Food Preferences of <i>Oreochromis mossambicus</i> (Peters, 1852) | At SUA, Tanzania |
| 10 | Noemia Andre Mugabe | Mozambique | Female | Sokoine University of Agriculture, Tanzania | Quality and Safety Assurance in the Informal Chicken Processing and Marketing Chain in the Southern Region of Mozambique | At SUA, Tanzania |
| 11 | Roberto Luís Nhamussua | Mozambique | Male | Sokoine University of Agriculture, Tanzania | Use of citrus fruit peel for Insecticide Production for pest control in <i>Brassica oleracea</i> var. <i>acephala</i> | At SUA, Tanzania |
| 12 | Sande Tamara Jose | Mozambique | Female | Sokoine University of Agriculture, Tanzania | Using APSIM model to assess the Effect of combined application of nitrogen and potassium doses on wheat (<i>Triticum aestivum</i> L.) nutrition, yield and grain quality | At SUA, Tanzania |
| 13 | Isaque Manteiga Joaquim | Mozambique | Male | University of Ghana | The macroeconomic determinants of private investment in the agrarian chain value of Mozambique (1975-2020) | Reporting from April 2023 |
| 14 | Murenju Doreen Chelangat | Uganda | Female | Makerere University, Uganda | Harnessing the potential of genomic prediction for key sweetpotato traits | At MUK, Uganda |
| 15 | Jean Claude Ndayisaba | Burundi | Male | Sokoine University of Agriculture, Tanzania | Tea commercialisation and food security among smallholder farmers of Mirwa region in Burundi | At SUA, Tanzania |
| 16 | Diana Asero | Uganda | Female | University of Ghana, Ghana | Assessing economic Impact of Postharvest losses within the Pineapple value chain in Uganda | At UG, Ghana |

Energy including renewables

| No | Name | Nationality | Gender | African Host University (AHU) | Research topic | Status |
|----|---------------------------|-------------|--------|--|--|---------------------------|
| 1 | Francisco Renato Pinto | Mozambique | Male | Institut International d'Ingénierie de l'Eau et de l'Environnement (2iE), Burkina Faso | Study of physical-chemical properties of the gas generated by the gasification of briquette of residual biomass of sawdust and paper using mathematical modeling | At 2iE, Burkina Faso |
| 2 | André Silvestre Cuinica | Mozambique | Male | University of Nairobi, Kenya | Study of wind energy potential in Baixa de Chicumbane in Gaza - Mozambique | At UoN, Kenya |
| 3 | Doglasse Ernesto Mendonca | Mozambique | Male | University of Nairobi, Kenya | Modeling and sizing of brackish water desalination plants powered by photovoltaic solar energy – Case study Boane district | At UoN, Kenya |
| 4 | Fauzia Argentina Guibunda | Mozambique | Female | University of Nairobi, Kenya | Design and simulation performance assessment of solar tunnel drier for biomass fuel briquettes in Mozambique | Reporting from April 2023 |
| 5 | Julieta Arnaldo Muchuane | Mozambique | Female | University of Nairobi, Kenya | Perspective of increase in energy generation produced through mini hydroelectric plants in Nampula province | At UoN, Kenya |
| 6 | Wakiang Emile Latchiba | Chad | Male | University of Nairobi, Kenya | Analysis and modeling of renewable energy systems in a sustainable development scenario: case of Chad | At UoN, Kenya |

Meet Doglasse Ernesto Mendonca



- Registered at University of Nairobi, Kenya,
- PhD programme in Physics
- Research topic: Modeling and Sizing of brackish water desalination plants powered by photovoltaic solar energy – Case study of Boane District.
- Presented at RSIF/MozSkills Results Sharing Seminar in Maputo on 14-Oct-22

ICTs including Big Data & Artificial Intelligence

| No | Name | Nationality | Gender | African Host University | Research topic | Status |
|----|---------------------------------------|-------------|--------|--------------------------------------|--|-----------------|
| 1 | Cecilia Rafael Jose Tivir | Mozambique | Female | University of Gaston Berger, Senegal | Web-based intelligent e-learning system based in student model for recommend learning materials | At UGB, Senegal |
| 2 | Hermenegildo Alberto | Mozambique | Male | University of Gaston Berger, Senegal | Anticipating cyber crimes in public and private institutions as a national security strategy - Mozambique | At UGB, Senegal |
| 3 | Armando Egas Jose | Mozambique | Male | University of Rwanda, Rwanda | Real time decision support system for climate smart agriculture | At UR, Rwanda |
| 4 | Catija Issumalgy Abdula | Mozambique | Female | University of Rwanda | Technological Development of Women in Mozambique | At UR, Rwanda |
| 5 | Onelia Fernanda Chico Caribo Trindade | Mozambique | Female | University of Rwanda | Application of the internet of things in blended education | At UR, Rwanda |
| 6 | Valinho Antonio | Mozambique | Male | University of Rwanda | Assessment of the spatio-temporal dynamics of corn production in Mozambique | At UR, Rwanda |
| 7 | Blondelle Melina Atsafack | Cameroon | Female | University of Rwanda | Contribution to the design of tele-operation tools for micro-hydropower plants in isolated sites in Africa | At UR, Rwanda |

Minerals, Mining and Material Sciences

| No | Name | Nationality | Gender | African Host University | Research topic | Status |
|----|-------------------------|-------------|--------|--|--|----------------------|
| 1 | Inacia Augusto Macapa | Mozambique | Female | Nelson Mandela African Institution of Science and Technology | Environmental impact of coal tailings stacking in the Moatize coal basin | At NM-AIST, Tanzania |
| 2 | Nordino Moises Mungoi | Mozambique | Male | Nelson Mandela African Institution of Science and Technology | Evaluating the hydrokinetic energy systems as an alternative for generating power in isolated communities of Mozambique: An economic technological and perspective | AT NM-AIST, Tanzania |
| 3 | Tsion Amsalu | Ethiopia | Female | Nelson Mandela African Institution of Science and Technology | Investigation of bentonite and kaolin exist in Ethiopia as partially replacement of Portland pozzolana cement on morphological characteristics of concrete | At NM-AIST, Tanzania |
| 4 | Tafadzwa Cecilia Nkhoma | Zimbabwe | Female | Nelson Mandela African Institution of Science and Technology | Synthesis of alkali activated filters from industrial by-products (red mud) for water and waste water treatment | At NM-AIST, Tanzania |

Benefits to Mozambican Institutions



Research. Innovate. Transform Africa

Rsif Research and Innovation Grants

Competitive grants complement the Rsif PhD training by providing an opportunity to faculty and researchers to advance their research excellence, trigger innovativeness and entrepreneurial spirit for economic development.

Designed to contribute to:

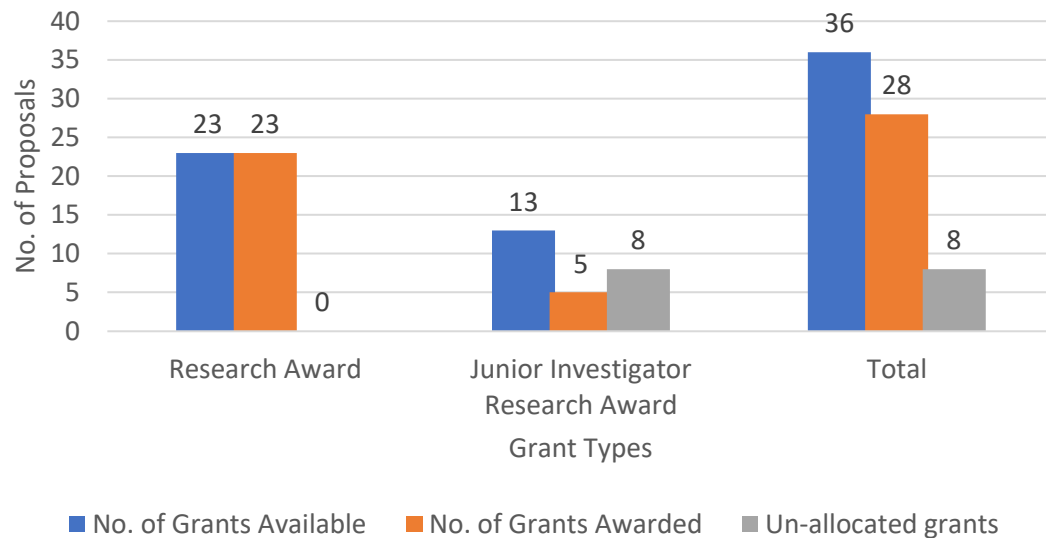
- Better qualified scientific workforce (including postdoctoral researchers)
- High quality research on key developmental issues
- Enhanced retention of PhD graduates
- Increased opportunities to translate research outputs into commercial products;
- Increased university-industry cooperation, networks & partnerships building



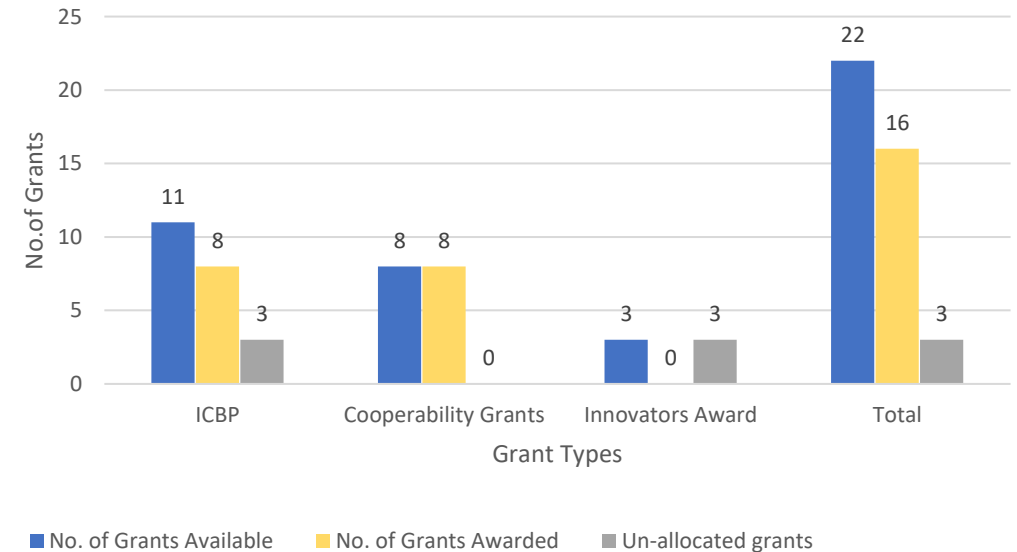
Photo: Mozambican institutions represented at RSIF MozSkills and IDF seminar in Maputo, October 2022

Enhancing Research and Innovation Excellence

RSIF Research Grants



RSIF Innovation Grants



Total Grants Awarded: US\$ 3.2 M

44 Research and Innovation Grants awarded to **7** SSA countries of which 12 in Mozambique

Overview of Rsif MozSkills Grants

| Grant Window | Type of Grant | Total Grants | Round 1 Grants Awarded | Round 2 Grants Awarded | Grants Remaining to Award | Amount per grant (US\$) | Grant Duration |
|-------------------|--|--------------|------------------------|------------------------|---------------------------|-------------------------|----------------|
| Research Grants | RSIF/MozSkills Research Award | 7 | 4 | 3 | 0 | 90,000 | 2 Years |
| | RSIF/MozSkills Junior Investigator Research Award (JIRA) | 3 | 0 | 0 | 3 | 80,000 | 2 Years |
| Innovation Grants | RSIF/MozSkills Institutional Innovation Capacity Building Program Grants (ICBP) | 5 | 1 | 1 | 3 | 70,000 | 2 Years |
| | RSIF/MozSkills Cooperability Grants | 3 | 1 | 2 | 0 | 70,000 | 2 Years |
| | RSIF/MozSkills Innovator Awards | 3 | 0 | 0 | 3 | 50,000 | 2 Years |
| Totals | | 21 | 6 | 6 | 9 | | |

Plans for technical assistance during implementation

Research Award

- Facilitate linkage with international partners, including private sector.
- Align research with national development strategies/plans.
- Enhance researcher engagement with policy makers.

Institutional Capacity Building Program Grants

- Facilitate collaboration for improving institutional innovation policies.
- Enhance University-Industry linkages.
- AHU IP/TTO strengthening on issues of IP & entrepreneurship.

Cooperability Grants

- Translation of technologies to commercially viable goods or services (market)
- Increase industry networking.
- Strengthen innovation capacity of faculty/ AHUs to commercialize research outputs.

Implementation support to be provided by RCU and Consultants (where necessary)

Meet Dr Nelson Zavale



Photo: Dr. Nelson Zavale presenting during the RSIF/MozSkills Results Sharing Seminar in Maputo in October 2022

- **Institution:** Eduardo Mondlane University
- **Type of Grant:** Institutional Innovation Capacity Building Program Grants (ICBP)
- **Project Title:** Strengthening collaboration between the Eduardo Mondlane University and the extractive hydrocarbon industry

More examples of on-going Research and Innovation projects in Mozambique



Increasing resilience of small holder farmers using Climate Smart Agriculture

By: Mozambique Agricultural Research Institute (IIAM)

Grant Type: Research Award



Criação de Empresas Sustentáveis de Estudantes como Alternativa de Auto-Emprego ([Creation of Sustainable Student Companies as an alternative to self-employment](#))

By: Higher Polytechnic Institute of de Manica (ISPM)

Grant Type: Institutional Capacity Building Progr.Grant

Biogas e Energia ([Biogas and Energy](#))

By: University Rovuma,

Grant Type: Cooperability Grant

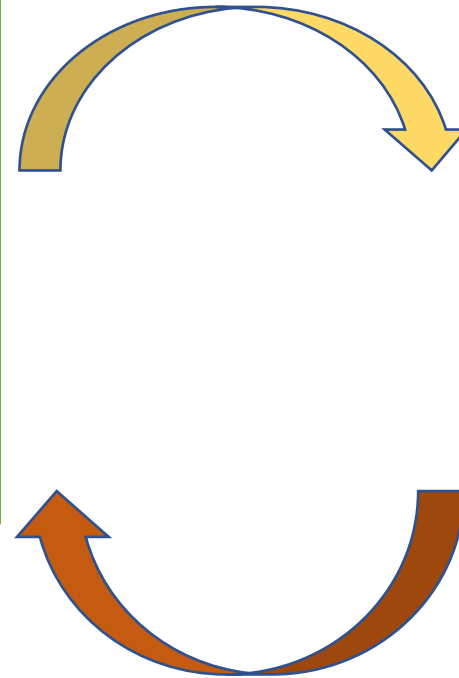


Conclusion

Research and innovation is a key driver for contributing to achieving sustainable development



Research & Innovation activities drive the achievement of SDGs, the SDGs can also shape the R&I agenda



17 GOALS to Future

| | | | | | | |
|---|--|-------------------|---|---------------------------------------|-------------------------|---|
| 17 PARTNERSHIPS FOR THE GOALS | 1 NO POVERTY | 2 ZERO HUNGER | 3 GOOD HEALTH AND WELL-BEING | 4 QUALITY EDUCATION | 5 GENDER EQUALITY | 6 CLEAN WATER AND SANITATION |
| 16 PEACE, JUSTICE AND STRONG INSTITUTIONS | This is the sustainable future we want | | | | | 7 AFFORDABLE AND CLEAN ENERGY |
| 15 LIFE ON LAND | 14 LIFE BELOW WATER | 13 CLIMATE ACTION | 12 RESPONSIBLE CONSUMPTION AND PRODUCTION | 11 SUSTAINABLE CITIES AND COMMUNITIES | 10 REDUCED INEQUALITIES | 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE |

Thank You

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