

South Eastern Kenya University

Institutional profile, capability evidence and contribution to a prospective consortium **Institutional context**

South Eastern Kenya University (SEKU) is a public university in Kitui County, Kenya. Its academic environment spans science and computing, agriculture and natural resources, engineering, health and social sciences. Its location in an arid and semi-arid region supports research in climate resilience, water, food systems and community priorities.

Capability evidence

Postgraduate training	The Board of Postgraduate Studies coordinates programmes and student support across schools.
Laboratories and ICT	The School of Science and Computing reports research and teaching laboratories; SEKU also provides computer laboratories and ICT services.
Research systems	Research, innovation and international linkages directorates support collaborations and knowledge exchange.
Field context	Potential Kenya-based field studies and stakeholder engagement, subject to local agreements, ethics and access.

Research delivery

SEKU reports National Research Fund-supported climate-smart rainwater harvesting and Moringa work, alongside collaborative research with World Agroforestry. The following pages provide selected publication and funding evidence and distinguish individual awards, SEKU participation and consortium totals. **Proposed MSCA fit**

SEKU can discuss quantitative-methods training, co-supervision, staff exchanges, field validation, community engagement and impact activities for Doctoral Networks and other suitable MSCA collaborations. Roles and commitments require call-specific and institutional agreement.

RESEARCH OUTPUTS / SELECTED EVIDENCE

Ten selected publications

A cross-disciplinary selection from SEKU researchers and collaborators. Item 4 is a preprint. Items 5–10 are listed in the SEKU institutional repository; full bibliographic details should be checked before formal proposal submission.

1. Ngesa, J.O., Kimathi, M., Mutwiri, R.M., Lang’at, R.C. & Sewe, S.O. (2026). Computational Fluid Dynamics Approach to Climate Resilience in Semi-Arid Regions. *Open Journal of Modelling and Simulation*, 14(3). DOI: [10.4236/ojmsi.2026.143006](https://doi.org/10.4236/ojmsi.2026.143006).
2. Ndengele, T.R., Mutwiri, R.M. & Odhiambo, F.O. (2025). Application of Markov Chain Model to Analysis and Prediction of Green Gram Price Transitions in Kitui County, Kenya. *Asian Journal of Probability and Statistics*, 27(7), 139–158. DOI: [10.9734/ajpas/2025/v27i7782](https://doi.org/10.9734/ajpas/2025/v27i7782).
3. Mwami, B.M. et al. (2024). Enhancing Sorghum Grain Yield and Associated Attributes through In Situ Rainwater Harvesting and Soil Mulching in Semi-Arid Regions of Southeastern Kenya. *International Journal of Agriculture and Biology*, 32(6). DOI: [10.17957/IJAB/15.2245](https://doi.org/10.17957/IJAB/15.2245).
4. Mutwiri, R., Ngesa, J., Mwangi, M. & Kimathi, M. (2026). Conventional time series, machine and deep learning approaches for rainfall forecasting in a bimodal climate in Embu County, Kenya. *Research Square preprint*. DOI: [10.21203/rs.3.rs-9725114/v1](https://doi.org/10.21203/rs.3.rs-9725114/v1).
5. Odek, J., Boitt, M., Thiong’o, K. & Kariuki, P.C. (2025). Litho-structural mapping via machine learning and geodata on remotely sensed data in the Tharaka-Kanzungu, Kitui-Kenya.
6. Kilonzo, B.K., Kiruki, H.M., Mbala, S. & Akuja, T.E. (2026). Role of Women Farmer Groups in the Adoption of Climate-Smart Agricultural Practices Under Private Sector-Led Extension in Kitui West Sub-County, Kitui County, Kenya.
7. Kilonzo, B.K., Kiruki, H.M., Mbala, S. & Akuja, T.E. (2026). Factors driving the adoption of climate-smart Agriculture Practices Promoted by the Private Sector among Women Farmer Groups in Kitui West Subcounty,

Kitui County, Kenya.

8. Manono, B.O. & Mwami, B.M. (2026). Agroforestry and soil health: A review of impacts and potential for sustainable agriculture.
9. Manono, B.O., Mwami, B.M., Mutavi, S. & Nzilu, F. (2026). Precision farming with smart sensors: Current state, challenges and future outlook.
10. Manono, B.O., Kimiti, J.M. & Musyoka, D.K. (2026). Landscape determinants of nitrogen leaching risk: mechanisms, impacts, and mitigation strategies.

Ten recent grants and funded projects

Institutional sources report these awards and collaborations. Consortium totals are not SEKU allocations. “Reported 2025” refers to SEKU’s newsletter date, not necessarily the award start date.

1. Horizon Europe TWIN4READY (2026)	SEKU partner in a funded flood-readiness consortium; EUR 5.96 million is the total consortium value.
2. UNESCO-TWAS breast cancer modelling (2025–26)	USD 42,000 award supporting equipment, MSc research and dissemination at SEKU.
3. Seeding Labs equipment grant (2025)	Award to SEKU life-sciences staff for research equipment; an equipment rather than cash research grant.
4. Wellcome leishmaniasis grant (reported 2025)	SEKU researcher Dr Sichangi Kasili belongs to a multi-institution team; the wider project grant exceeds KES 1 billion.
5. East African advanced ML school (reported 2025)	KES 5.6 million project grant reported for Dr James Linturi and multi-institution collaborators.
6. Data-driven epidemiological models (reported 2025)	KES 3.4 million project grant reported for Prof Malonza and collaborators.
7. EACEA higher-education capacity building (reported 2025)	KES 151.66 million consortium grant reported with SEKU staff among collaborators.
8. Google low-resource languages (reported 2025)	Research grant reported for SEKU faculty led by Dr Casper Shikali; amount unstated.
9. ACU women in innovation (reported 2025)	Association of Commonwealth Universities grant won by SEKU’s Business and Entrepreneurship team led by Dr Susan Wamitu.
10. Takeda-funded ENGAGE initiative (2023–26)	SEKU participates with the University of Nairobi and UCSF; SEKU-specific award value unstated.

CONSORTIUM ROLE / PROPOSED WORK PACKAGES

Contribution to the consortium

The following is an offer for discussion with an MSCA consortium, subject to call rules, institutional approval and partner agreement. **Proposed contributions**

Methods and modelling	Co-develop stochastic, Bayesian, spatiotemporal, physics-informed and explainable AI methods; evaluate uncertainty and robustness.
Doctoral training	Contribute specialist modules, seminars, co-supervision and mentoring under the network’s agreed model.
Case studies	Design and validate Kenya-based climate, water, food-system and health applications with local partners and data custodians.
Mobility and exchange	Plan reciprocal visits, field placements and research exchanges suitable for the selected action.
Impact and dissemination	Translate results into decision-support prototypes, policy-facing outputs, open methods and publications.

Doctoral research topics

The following topics are proposed for discussion with an MSCA Doctoral Network. Each project would be refined jointly with the consortium and assigned a supervisory team.

1. **Physics-informed AI for flood and drought forecasting.** Develop hybrid hydrological and machine-learning models that incorporate physical constraints, quantify forecast uncertainty, and support early warning in data-scarce catchments.
2. **Bayesian spatiotemporal models for climate-risk early warning.** Combine rainfall, satellite, sensor and historical impact data to estimate evolving flood, drought and water-stress risks, with interpretable uncertainty estimates.
3. **Explainable AI and digital twins for smart irrigation.** Integrate soil-moisture sensors, weather forecasts and crop models to optimise irrigation decisions and evaluate water-use efficiency under changing climate conditions.
4. **Climate-informed forecasting for resilient food systems.** Fuse climate, crop-production and market-price data to forecast agricultural supply and price volatility and assess decisions for smallholder farmers.

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