



INSTITUTIONAL BRIEFING PAPER

The QRIES Theory of Change

Accelerating environmental research into verified impact

A framework connecting quantitative research, postgraduate talent, environmental innovation, implementation and verified outcomes.

SEPTEMBER 2026

THE PROPOSITION

A shared institutional pathway from evidence to impact

QRIES is a membership-based quantitative environmental research translation centre. It brings African and global universities, research institutes, public institutions, industries and implementation partners together to solve complex environmental problems through evidence-based interventions.

The central problem

Environmental research, graduate education, technology development, implementation finance and impact measurement are often funded and managed as separate activities. Valuable knowledge may end with a publication, promising technology may stop at a prototype, and programmes may report outputs without establishing whether environmental systems actually improved.

The QRIES response

QRIES coordinates these elements as one institutional pathway. Quantitative evidence identifies what is happening and where losses occur. MSc and PhD researchers develop the models and skills required to investigate the system. Innovation processes convert credible findings into practical interventions. Implementation partners provide operational environments, and verified measurement determines whether the intervention works and can scale.

20+	3	4	4
Member institutions	Institutional pillars	Research-to-impact stages	Priority environmental systems

WHY THE MODEL IS NEEDED

The environmental research-to-impact gap

Funded programmes frequently contain strong individual components but lack the institutional mechanisms that connect them.

Fragmented evidence

Scientific studies, operational data and community knowledge remain disconnected, making intervention choices difficult to defend.

Separated talent systems

Postgraduate training is often detached from the datasets, infrastructure and implementation partners needed for applied research.

Prototype without adoption

Technologies may be technically promising but lack validation, financing, ownership and operating models.

Outputs without verified outcomes

Programmes count activities and deliverables without consistently measuring environmental and institutional change against a baseline.

QRIES exists to close these gaps through a governed consortium that links research quality, institutional capacity, implementation and accountability.

THEORY OF CHANGE

How QRIES expects change to happen

If institutions pool quantitative expertise, postgraduate talent, infrastructure, operational data and implementation capacity within a governed research translation platform, then multidisciplinary programmes can generate stronger evidence, design more context-appropriate interventions and build credible adoption pathways. When outcomes are measured against an agreed baseline, funders and partners can identify what works, improve programme decisions and scale successful approaches responsibly.

INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES	IMPACT
Institutions Researchers MSc/PhD talent Data and facilities Funding and field sites	Quantify problems Detect losses Model alternatives Validate solutions Coordinate implementation	Models and datasets Publications and briefs Trained researchers Pilots and decision tools Adoption models	Better decisions Stronger institutions Validated interventions Resource efficiency Implementation capacity	Reduced pollution and loss Reliable infrastructure Climate resilience Economic viability Scalable public value

Core assumption

Environmental impact accelerates when research generation, talent development, intervention design, adoption and verification are funded and governed as a connected system rather than isolated workstreams.

INSTITUTIONAL MODEL

Three mutually reinforcing pillars

The pillars describe the capacities QRIES continuously builds across its member network.

01**Quantitative Environmental Research**

Multinational programmes applying mathematics, data science, AI, systems modelling and optimisation to environmental performance, infrastructure reliability and resource efficiency.

Typical outputs: Grants, models, datasets, publications, policy evidence and decision tools

02**Graduate Education and Mobility**

MSc and PhD pathways connecting home universities, partner institutions, field sites and industry laboratories through joint supervision and shared research infrastructure.

Typical outputs: Co-supervised research, mobility, doctoral schools, exchanges and institutional capacity

03**Environmental Innovation and Entrepreneurship**

Research-to-implementation support that validates technologies, develops adoption models and creates pathways through public systems, industry, licensing or responsible enterprise.

Typical outputs: Pilots, demonstrators, intellectual property, adoption agreements and viable ventures

RESEARCH-TO-IMPACT METHOD

Four stages for every programme

The methodology structures individual grants and programmes around four connected questions.

01	Impact Intelligence What is happening, where, to whom and at what cost? Build environmental, operational, social and economic baselines using field observations, geospatial evidence, system models and stakeholder data.
02	Anomaly and Efficiency Analytics Where are the hidden losses, failures and abnormal patterns? Apply statistics, AI and mathematical models to detect anomalies, quantify inefficiencies, predict risks and prioritise action.
03	Systems Intervention Design Which intervention can reduce harm, recover value or improve performance? Compare remediation, resource-recovery, optimisation and regenerative alternatives using technical, environmental, social and economic criteria.
04	Verified Impact and Scale Did it work, for whom, and can it scale sustainably? Measure outcomes against the baseline and build credible pathways for adoption, financing, policy integration and responsible commercialisation.

APPLICATION PORTFOLIO

Connected environmental systems

QRIES applies one quantitative research translation approach across four initial application systems.

Water and Wastewater

Water quality, leakage and non-revenue water, distribution analytics, treatment, reuse, source-water risk and flood resilience.

Waste and Circular Resources

Collection, waste characterisation, material recovery, organics, anaerobic digestion, recycling, biorefineries and remediation.

Energy and Industrial Systems

Renewable integration, technical losses, industrial efficiency, bioenergy, waste-heat recovery and process reliability.

Agriculture and Food Systems

Livestock and manure, food loss and waste, nutrient recovery, water and energy use, and climate-resilient production.

Cross-system value

Many challenges sit between sectors: waste becomes energy or fertiliser; water reliability affects food production; industrial efficiency changes emissions and operating cost. QRIES uses systems modelling to make these connections visible and test intervention trade-offs before implementation.

CAPACITY AND ADOPTION

People and institutions carry impact beyond the grant

The model treats postgraduate development and adoption capacity as part of the intervention, not as side activities.

Research talent pathway

- Candidates remain registered at accredited member universities.
- Research challenges and supervisory teams are drawn across member institutions where feasible.
- Methods preparation covers quantitative modelling, environmental systems, responsible AI, innovation and impact verification.
- Mobility connects candidates to partner laboratories, utilities, companies, municipalities and field sites.
- Applicable findings progress toward technology, intervention or decision-tool validation.

Adoption pathways

Not every research output should become a startup. QRIES selects the pathway that best protects public value and sustained use: public-sector implementation, industry transfer, licensing, open infrastructure, standards and policy integration, or responsible venture creation.

PUBLIC SYSTEMS	INDUSTRY TRANSFER	RESPONSIBLE VENTURES
Policy, utility or municipal adoption	Validation, licensing and operational integration	Enterprise when a viable delivery model is required

VERIFICATION

What QRIES measures

Each programme begins with a documented baseline and selects indicators appropriate to its environmental system, intervention and affected stakeholders.

Environmental performance	Pollution reduced; emissions avoided; water saved; waste diverted; nutrient recovery; ecological condition.
Infrastructure and operations	Reliability, leakage, downtime, process yield, energy intensity, service quality and operating cost.
Research and talent	Grant income, models, datasets, publications, MSc/PhD completion, mobility, supervision and researcher progression.
Innovation and adoption	Technologies validated, pilots completed, adoption agreements, licensing, ventures, policy uptake and replication finance.
Institutional strengthening	Shared infrastructure, improved research management, cross-institutional teams, financial compliance and sustained partnerships.

Verification principle

QRIES separates activities, research outputs, adoption outcomes and verified environmental impact. Results are reported only when evidence, timing, responsibility and comparison with the baseline are clear.

PARTNERSHIP MODEL

How funders can work with QRIES

QRIES provides an institutional structure through which funders can assemble multidisciplinary consortia and finance a connected pathway from research to implementation.

Programme design

Define the environmental challenge, geography, affected systems, evidence gaps, partners and intended outcomes.

Consortium formation

Assemble research, education, public-sector, industry, community and implementation capabilities through clear roles.

Integrated work packages

Connect baseline research, models, postgraduate projects, validation, implementation, policy translation and verification.

Governance and compliance

Establish scientific oversight, grant management, ethics, data governance, financial controls and reporting responsibilities.

Evidence and learning

Publish verified findings, policy briefs, research explainers and implementation lessons to support replication.

QRIES is suited to funders seeking both measurable environmental outcomes and durable institutional research capacity across Africa and its global partner network.

THE QRIES COMMITMENT

Research should not end with a paper. Innovation should not end with a prototype.

QRIES links quantitative evidence, mobile research talent, intervention design, implementation pathways and verified results within one governed institutional platform.

- African problem ownership with globally connected science.
- Transparent selection of institutions, investigators, candidates and field partners.
- Scientific independence, research integrity and responsible use of data and AI.
- Fair authorship, intellectual property and benefit-sharing arrangements.
- Environmental results assessed alongside operational and economic viability.
- Evidence made understandable to funders, policymakers, practitioners and communities.

PARTNER WITH QRIES

Develop a research programme, form a grant consortium, support MSc and PhD mobility, provide an implementation environment, or co-finance a pilot and its verification.

qries-centre.abufabrice.chatgpt.site