Contract Section 3: Terms of Reference

Understanding knowledge systems and what works to promote science technology and innovation in Kenya, Tanzania and Rwanda

Terms of Reference

1. In many countries in Africa there is growing domestic political support for nationally-led investment in science, technology and innovation and the underpinning knowledge system, as a means to deliver strong growth and skilled people who can be agents of change, and support economic and social development. A number of countries have recently adopted new science, technology and innovation strategies and increased their budget commitments and Africa-led initiatives, including the Science, Technology and Innovation Strategy for Africa 2024, the Malabo Declaration and the Science Agenda for Agriculture in Africa, have helped to build capacity to do and use research. In many countries, demand for higher education is surging, with tertiary enrolments increasing rapidly. However there are a number of challenges: a rapidly expanding higher education system focussed on teaching means that research systems are weak; many teaching staff do not have research experience; leading academics often supplement their primary income with additional income from consultancies; curricula are not linked to the needs of industry and links are few; evidence does not necessarily inform policy. Institutions to manage Governments new investments in science technology and innovation, such as Science Granting Councils, National Research Funds and other subregional organisations are new or have been recently re-constituted[i].

2. There is widespread recognition of the need to invest in science, technology and innovation capability in low and middle income countries, and strengthening the knowledge economy - there is limited evidence on how this can best be achieved. Implicitly, an effective knowledge system should produce high quality higher education; research, innovation and new technologies; and effective evidence based policies, with an assumption that these drive human capital development and ultimately economic growth. For low income and lower middle income countries there is very limited evidence on how to develop a strong 'knowledge system' and what are the most effective investments to drive its outputs[ii]. Furthermore, what evidence does exist is primarily drawn from analysis of northern systems; whereas it is acknowledged that the most effective solutions must emerge locally and be rooted in a local problem-solving processes.

3. Most evidence on knowledge systems come from studies of national innovation systems[iii]. The concept of a national innovation system was first proposed in 1988, with most empirical studies to date focussed on higher income and OECD countries. There is also a limited evidence base on national 'research systems' similarly focussed on higher income countries. There is limited evidence that these two concepts have been compared or linked in the literature.

4. The research and innovation needs of Low Income Countries (LICs) and Lower Middle Income Countries (LMICs) will be different to those of developed countries. Country contexts will also vary, for example by the strength of institutions, levels of investment, interaction between actors in the system and external networks and the macroeconomic environment. For Kenya, Tanzania and Rwanda, there are new political and financial commitments on science, technology and innovation, but a limited evidence base how to develop an effective knowledge system and what works to increase the impact of investments in science technology and innovation.

5. The UK has strong historical relationships with research and higher education institutions in Kenya, Tanzania and Rwanda. The UK Spending Review has resulted in an increase in UK's Official Development Assistance (ODA) on research under UK Aid Strategy, including new funding instruments like the Global Challenge Research Fund; the Ross Fund, increases in investment in the Newton Fund and DFID's commitment through its Research Review. This is an important opportunity to ensure effective research partnerships with research institutions in Kenya, Rwanda and Tanzania, which work to support countries own investments in science technology and innovation.

6. This research will help to inform effective investments in science, technology and innovation by Kenya, Tanzania and Rwanda and their external partners.

Purpose and Objectives

7. To propose a practical and context specific knowledge system concept for Kenya, Tanzania and Rwanda which is informed by appropriate international evidence of what works in innovation and research system approaches; and propose practical actions and recommendations for effective investments in science, technology and innovation by these countries and their partners.

Specifically:

1. Propose a practical knowledge system concept based on international and national evidence of innovation and research system approaches; define these systems, including the links between national and international knowledge systems; and develop a theory of change for each country setting for essential elements or interactions to drive innovation and research.

2. Describe the country knowledge system in Kenya, Tanzania and Rwanda including its key constituencies and institutions; policy and regulatory frameworks and levels and sources of financing and the key elements or interactions that should drive innovation and research.

3. Identify gaps, barriers and enablers in each knowledge system, what works or does not work and why for the key elements and interactions which should drive innovation and research

4. Assess the feasibility, and propose an approach to set out the economic case for investment in science, technology and innovation in Kenya, Tanzania and Rwanda, particularly for governments, and, if approved, to take this analysis forward.

5. Based on evidence and wide consultation with key stakeholders on the practical application of this research and resources available, identify practical actions to strengthen the knowledge system each country and recommendations to improve the impact of investments in science, technology and innovation

Scope
6. The primary consideration of this research is to bring together robust international evidence and country level research to inform <u>a clear and practical</u> approach for national decision makers in Kenya, Tanzania and Rwanda and their partners[iv]. A detailed scope to achieve this is set out here. Based on this scope, suppliers are invited to set out proposals for a methodological approach, stakeholder engagement and communications arrangements to achieve this.

a) An initial **scoping exercise** will:
- Consult closely with key stakeholders and research team members in each country on the complexity of the study feasibility of the methodological approach considering, in particular, whether to focus analysis on sectoral - rather than national – knowledge systems across this study.
- Scope availability of existing international and country evidence, grey literature and data
- Further refine and finalise the methodological approach, setting out: a draft conceptual framework for the 'knowledge system' and how this relates to national innovation and research systems concepts; overarching research questions, detailed methodology with data collection protocols and data analysis plan, risk analysis.
- Set out the feasibility of and proposed methodology for the investment case for investing in science technology and innovation in each country, particularly by governments.
- Set out a workplan which will provide stakeholder consultation events, interim reports and deliverables at key stages
- Highlight any potential limitations or constraints with available information and data sets

b) A robust **review of existing evidence and development of the theoretical approach** will:
- Using the proposed knowledge systems conceptual framework, conduct a rigorous, impartial review of available evidence related to national knowledge systems, drawing from national innovations

systems and research systems evidence particularly in LICs and
LMICS.

- Consider this evidence in light of practical understanding of knowledge
systems in developing countries, identifying any gaps in the evidence
and areas for further research.
- Review available international evidence on factors/elements to drive
innovation and research and interventions to strengthen knowledge
systems.
- Consider how learning from national systems analysis in other sectors
(for example in health) may be adopted and applied to knowledge
systems development and analyse any identified differences in
knowledge systems across sectors.
- Based on the review of evidence refine and finalise the conceptual
framework for the analysis of the 'knowledge system' at country level
and a theory of change for driving innovation and research through
national knowledge systems development in each country setting.

c) The **mapping and description of a country knowledge system[1]** will be
based on the conceptual framework and applied in Kenya, Tanzania and
Rwanda to:
- Identify and describe each of the *types* of institutions/actors within each
of the constitutions of the knowledge system. The aim is not to provide
an exhaustive listing of institutions but to identify different types of
institutions/actors within the constituency.
- Conduct a policy analysis of the policy environment of the knowledge
system.
- Identify the financial resources within the system, where these originate
and their relative contribution; and how these are structured (e.g.
national vs international, core vs programme; inputs vs outputs etc.)
- Identify in what ways these types of intuitions/actors constituencies
interact with others constituencies, and interventions to support
innovation and research.
- Identify and map existing interventions to develop knowledge systems
(including research or innovation capacity strengthening). The aim is
not to provide an exhaustive listing of institutions but to identify *different
types of interventions*, their evidence base and how they fit within a
knowledge system framework.
- In light of the analysis of the knowledge system identify gaps in the
system or areas to support its further development for each country
setting.

d) **Political economy analysis** helps to understand what drives political
behaviour, how this shapes particular policies and programmes, who are
the main "winners" and "losers", and what the implications are for
development strategies and programmes. This political economy analysis
will:

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[1] If scoping proves feasibility, national knowledge systems will be the focus. If not, the focus
will be on the knowledge system of pre-agreed sector[s].

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- Analyse the strengths and weaknesses of the knowledge system (including constituencies and key institutions), identify any critical gaps or constraints
- Identify barriers and enablers in each context to *interactions* between constituencies and to promoting innovation and research, in particular:
    - interests and incentives facing different groups and constituencies within the knowledge system
    - the role that formal institutions (e.g. the regulatory and policy environment both at national and institutional levels) and informal social, political and cultural norms play in shaping research and innovation
- Identify whether existing interventions to develop knowledge systems (including research or innovation capacity strengthening) are working or not, and the underlying reasons why
- Identify how and where Government and their partners could focus efforts to promote research and innovation, and potential drivers or constraints to this.
- Revise or re-present the knowledge systems framework and theory of change for each country based on the evidence review and research in country setting

e) If approved, the economic **investment case** for investing in science technology and innovation in each country will
- Synthesise and collect data to set out the investment case for science, technology and innovation for each country overall
- Based on the robust literature review and political economy analysis compare the investment case for *specific areas* of science, technology and innovation that should have a high return on investment in each country
- Set out a clearly with evidence how this case may differ due to the economic structure of the country (particularly with reference to the major productive sectors); the knowledge system level of development and barriers and enablers within the system
- For each country recommend interventions/areas of investment for knowledge system development and science, technology and innovation likely to have a greatest return of investment in the context

f) The identification of **practical actions to strengthen the knowledge economy** will
- Consult closely with key stakeholders and constituencies on their priorities for science technology and innovation, and on findings of the research at key stages during the process
- Use this consultation to develop and hone practical action points which could be taken up in the setting to support the further development of the knowledge system

Methodology

7. It is expected that the **review of existing evidence and further development of the theoretical approach** will be a robust review and significant output of the project. The research team will conduct a rigorous impartial review of the existing literature and data to critically appraise it on quality and relevance in relation to the research questions. This will build on Economic and Private Sector PEAKS desk review[v]. It will not be a systematic review, but the research team will be expected to set out a clear methodology for systematically searching, selecting and reviewing evidence for inclusion in the review. The review will involve a critical analysis of both published and grey literature and data, highlight and compare findings from key sources, identify gaps or inconsistencies in the current body of knowledge, as well outline an approach to assessing the quality and strength of evidence in accordance with DFID guidance.[vi] The reviews should include a commentary on quality of available data sources used and whether data is open source, available on request, or not publically available and where possible an indication of how the data has been used in the four countries. The outputs should clearly outline the limitations with existing information and identify priority evidence and data gaps to be addressed.

8. The **mapping and description of a country knowledge system** will involve mixed methods research. The Research Team will be expected to develop a detailed research protocol for this objective setting out the research questions, research methods, sampling strategy, data handling and analysis and measures to ensure the robustness of the research at all stages. This will include a research matrix table linking each research question to the methods to address it, sampling and sample size for each method and target respondents and data to be collected. Fieldwork should involve both quantitative and qualitative methods. The Research Team are strongly encouraged to use and build upon the existing data, particularly data available through the Science Granting Councils Initiative.

9. The **political economy analysis** will involve both desk based and fieldwork in each country setting. The research team will apply the conceptual framework to take an in-depth look at the political economy drivers and constraints of the knowledge system and innovation and research. The analysis will include an analysis of the structural constraints-barriers that may affect women's participation in knowledge/innovation systems. In developing the detailed methodology, the research team should consult the guidance in the DFID paper on political economy analysis[vii] and the World Bank How to notes on political economy assessments at sector level.[viii] It is expected that qualitative research methods will be largely used for the political economy analysis, primarily key informant interviews in within each of the constituencies of the knowledge system. The aim of this analysis should be to identify key lessons learnt and opportunities to support innovation and research in future and recommendations for areas of investment with likely success.

10. The **investment case** analysis will commence with a feasibility assessment based on a review of international evidence on a return on investment approach for national level country investments in science, technology and innovation. The scoping will also assess the availability of relevant data in each country setting. If feasible, the research team will set out the methodological approach and detailed costing and workplan to implement the research. The team will set out assumptions clearly and include sensitivity analysis.

11. The identification of **practical actions** will be based on a process of consultation and iteration with key stakeholder in each setting. It is likely that longer term reform issues may be raised through the research, but it is also important that recommended actions are well grounded in the context, practically focussed and feasible. Insights in terms of gaps in knowledge and areas for future research should be presented.

12. The study will include a gender disaggregation of data as far as possible, and including a consideration of gender within the political economy analysis.

Study outputs

13. The overall research project will take place over 18 months, with a number of important and timed deliverables.

Milestone 1 (month 3): scoping report no more than 20 pages plus annexes, including:
- Assessment of feasibility of the methodological approach; availability of existing evidence and information including any potential limitations or constraints with available information and data sets
- A detailed methodological approach setting out overarching research questions, a detailed methodology and data collection protocols, risk analysis
- Stand-alone detailed annex (maximum 10 pages) on the feasibility of and proposed methodology for the investment case for investing in science technology and innovation in each country.
- Workplan with key milestone and meeting dates
- Stakeholder consultation, communication and research uptake strategy

Milestone 2 (month 6):
- *Draft* report on the review of existing evidence on national knowledge systems, factors which drive innovation and research at national level, evidence on what works to strengthen knowledge systems, and proposed conceptual approach and theory of change for each country setting.

Milestone 3 (month 15):
- Final report in the form of a draft academic paper on the robust review of existing evidence on national knowledge systems, factors which

drive innovation and research at national level, evidence on what works to strengthen knowledge systems, with annexes on the conceptual approach and theory of change for each country setting.

- Draft report no more than 20 pages for each country setting presenting the early analysis of the country knowledge system, its key constituencies and the factors/elements or interventions to drive innovation and research and the applicability of the knowledge systems concept.
- (If approved for research) Draft reports of no more than 15 pages on early analysis of the investment case
- Draft briefing notes up to 3 pages for each country summarising the key findings.
- Consultation in each country to consult on the findings and develop and hone practical actions to support research and innovation

Milestone 4: (month 18)
- Overarching summary report for the project on the development of the knowledge system framework, evidence review and lessons from application in three country settings, plus the investment case findings (no more than 30 pages plus annexes)
- Final briefing note up to 3 pages on the overall knowledge system framework approach
- Final report *for each country* of no more than 20 pages (plus annexes) which summarises the findings from mapping and description and political economy analysis, investment case summary and recommendations for practical actions for each country's knowledge system.
- Final briefing note up to 3 pages *for each country* summarising the findings from the study
- Final detailed report *for each country* of the investment case no more than 10 pages (plus annexes) with recommendations for practical actions with a likely high return on investment
- Final briefing note up to 3 pages on the investment case for science, technology and innovation *for each country*
- Three or more academic papers from the research which have been peer reviewed and formatted to submit for publication. The research team will propose the expected number and proposed topics for these papers at Milestone 1.

Briefing notes will be short, clear and written for a non-academic audience. These will be drafted for use by key government partners, key stakeholders and DFID. The academic papers should be of high-quality and follow specific presentation requirements eligible for peer reviewed publication. The Research Team will identify appropriate journals relevant to the nature of the research and organise submission of the paper for journal publication.

Research uptake:
   14. The Research Team should include in their tender an outline proposal for research uptake of study findings in accordance with DFID

guidance.[ix] This will be developed further and finalised during the scoping phase (by end month 3). Key stakeholders for this research will advise the research team on how the outputs will be used and key policy fora for presentations. The key stakeholder consultation should include a meeting with the External Advisory Committee in one of the three countries at month 15.

15. In addition to consultations and research visits (set out in the methodological approach) the Research Team will prepare for three consultation meetings on the research finding, one in each country at/around months 15/16. These will form part of the ongoing high-level policy for a in each country.

16. The research products will follow specific, consistent format requirements including systematic searching, reporting, summarising and external peer review. In line with DFID best practice, reports and papers produced from this study will be published on 'Research for Development' website[x] and disseminated to key stakeholders.

17. The Research Team should include in their tender a clear description of how the team will meet institutional ethical requirements, as set out in the DFID guidance[xi]. This should include, but not be limited to, demonstrating an understanding of the sensitive nature of the research and issues of access and confidentiality related to this and how to mitigate risks for respondents and researchers.

Management Arrangements
18. The Research Team will design and manage this research study, including drawing together the findings for reporting and undertaking dissemination activities. It is expected that the overall team will be comprised of a Principal Investigator responsible for the overarching question, with a Co-Principal Investigator from the region, and Research Leads *for each country study*. Team composition and coordination approach will be proposed by the Research Team.

19. An External Advisory Committee will be convened by the Research Team to provide guidance and advice on the study design and implementation. It will include a Government or National Research Council representative from Kenya, Tanzania and Rwanda; country Research Leads; representation from UK; co-funding partners to DFID's research strengthening programme; and independent Advisers. Each country will have a Country Advisory Group comprising the country Research Lead and key representatives and policy makers for Science Technology and Innovation. A smaller Overarching Steering Group will provide oversight, approve study outputs and oversee progress. It will comprise key individuals from DFID's Research and Evidence Division and a few external stakeholders.

20. This study will be procured and managed by DFID. The EARH team will manage the programme on a day-to-day basis, acting as the direct

point of contact for the Research Team and coordinating and communicating the consolidated technical inputs from the Steering Group. All project milestone deliverables will need to be reviewed and approved by the Overarching Steering Group. The SRO for the programme will be the EARH lead for the research systems strengthening portfolio.

21. Value for money in relation to the delivery of this project will be achieved through open competition to identify the most appropriate supplier. All bids received will be subject to a full technical and commercial evaluation against published criteria to determine which supplier's proposal would best meet the call's requirements and deliver a high quality project and suitably address value for money considerations. This will also enable a comparison of unit costs.

22. The Research Team will be involved at least 4 meetings with the External Advisory Committee (1 before the end of the scoping phase (3 months), 1 before submission of Milestone 2, 1 at Milestone 3 (15 months) and 1 before the end of project. Meetings will take place in one of the three countries, and will also involve teleconferencing or videoconferencing. Additional meetings for consultation and policy uptake in each country and in UK will be set out in the proposal and scoping report. This should include a presentation by the Principal Investigator(s) at a regional meeting or annual forum of the Science Granting Councils Initiative.

23. Potential suppliers are also encouraged to think about their own internal mechanisms for quality assurance and allow for the costs and time of external peer review in the technical and commercial proposals.

Project Team

24. Collaborating institutions must be a recognised higher education institution, research organisations or organisations with a credible research capacity and experience of conducting similar research projects. There will be a Principal Investigator for the overarching questions and management of the study. The Principal Investigator's institution should demonstrate adequate capacity to undertake the management of this project. The Principal Investigator for the overarching programme will quality-assure the outputs before submission to DFID

25. Tenders from suitably qualified organisations or consortia are equally welcome. We welcome leadership of the country studies by a Co-Principal Investigator from the region, and Research Leads from each country setting.

26. Preference will be given to groups incorporating experience of knowledge systems academic analysis and application internationally, with country-specific knowledge systems expertise for each country.

We encourage teams to consider how to promote the further academic development of the researchers involved in each country working under the mentorship and supervision of the Principal Investigators.

27. Full CV's of the Principal Investigators and academic expert(s) must be submitted within proposals. Individual researchers are permitted to be involved in multiple group bids to this call. CV's should be limited to 3 pages. The Research Team should demonstrate knowledge and expertise of the research questions and strong relationships with key knowledge system stakeholders, particularly the Government and national Science Granting Councils (Research Councils) in each country.

28. Bidders are encouraged to briefly outline how they will ensure independence in their work in their proposals and manage any potential conflicts of interest.

29. Value for money (in respect of both the overall package of work proposed and the rates for project team members' time and other costs) will be a key criterion in tender assessment.

Skills and Qualifications

30. The Research Team is expected to demonstrate:

- Academic track record and specialist experience of Knowledge Systems theory and evidence (this may be drawn from national innovation systems and/or national research systems)
- Knowledge and in-depth experience of the Knowledge Systems (i.e. innovation and/or research systems) in three country settings
- Managing and undertaking rigorous evidence synthesis products.
- Knowledge and specialist experience of political science and robust political economy analysis, preferably working in the countries.
- Knowledge and specialist experience of value for money and economic investment case analysis and preferably of national investments in science, technology and innovation; innovation or research systems.
- Getting research products into use through peer reviewed academic papers for publication.
- Strong written and oral communications skills, including to a non-technical audience

Timeframe

31. The overall time frame for this programme is 18 months. Teams will be expected to mobilise quickly following contract signature.

Reporting and Monitoring and Evaluation

32. In addition to the project deliverables (outlined under 'Study Outputs') the research team will need to ensure programme management reporting to the EARH. This includes short quarterly progress reports to accompany financial reports. All 'Study Outputs' need to be approved by DFID based on the advice and recommendation of the Overarching Steering Group.

33. The Scoping Report (Milestone 1) outlining the detailed methodological approach needs to be approved for the continuation of the study. Breakpoint meetings will be scheduled after the submission of Milestone 1 and Milestone 2.

34. At Milestone 1 the Steering Group will also review the feasibility of and proposed methodology for assessing the economic investment case for investing in science technology and innovation in each country (based on the stand alone annex in the Scoping Report). If approved this component of the overall study will move ahead. (Budgets within the tender should show as a separate section the provision for the continuation of this study component (if approved) but this should fall within the overall proposed costs of the study).

Duty of Care and Logistical Arrangements

35. It is essential that potential suppliers are aware of DFID's Duty of Care policy[xii] and take appropriate security precautions as required. A Duty of Care Assessment is included in Annex A. Bidders will be asked to develop their tenders on the basis of being fully responsible for Duty of Care and that they have the capability to provide security and duty of care for the duration of the contract. Capacities for security and duty of care management in particular countries will be assessed during the tender evaluation process.

36. Bidders should set out in the tender how they will manage conflict of interests and ethics, and what procedures they will put in place to ensure the programme will adhere to DFID's Ethics Principles, and how any issues will be managed.

UK Aid Branding

37. Partners that receive funding from DFID must use the UK aid logo on their development and humanitarian programmes to be transparent and acknowledge that they are funded by UK taxpayers. Partners should also acknowledge funding from the UK government in broader communications but no publicity is to be given to this contract without the prior written consent of DFID.

Transparency

38. DFID has transformed its approach to transparency, reshaping our own working practices and pressuring others across the world to do the same. DFID requires Suppliers receiving and managing funds, to release open data on how this money is spent, in a common, standard, re-usable format and to require this level of information from immediate sub-contractors, sub-agencies and partners.

39. It is a contractual requirement for all Suppliers to comply with this, and to ensure they have the appropriate tools to enable routine financial reporting, publishing of accurate data and providing evidence of this DFID – further IATI information is available from; http://www.aidtransparency.net/

Digital Principles for Partners and Suppliers

40. DFID expects all partners and suppliers who manage aid programmes with a digital element to adhere to the global [Principles for Digital Development](). If any proposal contains a digital element this must be costed separately within the proformas and are subject to approval by DFID's digital team.

Research Ethics

41. It is essential that the any research conducted under this programme adheres to appropriate ethical practice. Contracts will only be awarded to Suppliers where research / evaluation ethics and appropriate ethical clearance protocols are embedded in their institutions or where they are approved by independent Ethics Review Committees who are responsible for giving ethical clearance. Strengthening ethical practice for research and evaluation will form a key part of any capacity building efforts with partner organisations.

42. Key points to be considered include:
    - Information gathering and documentation must be done in a manner that is methodologically sound, and builds on current experience and good practice
    - Protecting confidentiality of individuals and institutions is essential to ensuring no harm to respondents and data quality
    - Anyone providing information must give informed consent before participating in the study

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Background

43. The Department for International Development (DFID) is the part of the UK government that manages Britain's aid to low-income countries and works to eradicate extreme poverty. DFID's East Africa Research Hub (EARH) supports DFID country offices in Eastern Africa (Kenya, Tanzania, Uganda, Rwanda, Ethiopia, Somalia, Sudan and South Sudan) to use evidence to drive development impact and value for money, linking with UK's wider science and research agenda in the region.

44. This research will part of an overarching programme supported by DFID on 'Strengthening research systems for poverty reduction in East Africa'. It will link to and complement existing collaborations under this programme. These are:

Science Granting Councils Initiative[xiii] which aims to strengthen the capacities of fifteen science granting councils in sub-Saharan Africa in order to support research and evidence-based policies that will contribute to the continent's economic and social development. This is acollaboration between Canada's International Development Research Centre, South Africa's National Research Foundation and DFID.

Accelerating Excellence in Science in Africa[xiv], an initiative of the African Academy of Sciences (AAS) and the New Partnership for Africa's Development (NEPAD) Agency, which is an agenda setting andfunding platform established to address Africa's health and development challenges. AESA is co-funded by the Wellcome Trust and the Bill and Melinda Gates Initiative.

45. There are specific initiatives under these two programmes where this research will be expected to be aware of, link to and build on wherever possible:

- <u>Understanding the political economy of Science Granting Councils in Sub-Saharan Africa.</u>

This is a baseline study of key political and economic factors influencing Science Granting Councils at a regional and sub-regional level in Africa. Additionally, five Sub-Saharan African countries will be studied in more depth, including Kenya, Tanzania and Rwanda. The study is being conducted by the Science Policy Research Unit (SPRU) at the University of Sussex and the African Centre for Technology Studies (ACTS), based in Nairobi. The study focusses specifically on Science Granting Councils, not the wider knowledge system, but will form an important contribution to this study in Kenya, Tanzania and Rwanda. The report is due in mid-2017.

- Under Accelerating Excellence in Science in Africa, Liverpool School of Tropical Medicine is conducting <u>cross-portfolio research and learning</u> on: promoting equitable career pathways for internationally competitive African researchers including women and other under-represented groups; improving the quality of institutionalised research training;

encouraging researchers to do research that is needed and used in Africa

- Desk review on <u>Development of national knowledge systems to support the knowledge economy development in low and middle-income countries: Literature review.</u> PEAKS Helpdesk report.

46. This TOR uses the term 'knowledge system' in order enable an open exploration of national 'systems' or ecosystems approaches to science, technology and innovation. It is expected that the development of the concept and theory of change for investments in Kenya, Tanzania and Rwanda will be based on a robust review of evidence on national innovation systems and research ecosystems, and build on this.

47. As an illustration of a *possible* knowledge system approach, system actors in innovation or research systems may include knowledge producers, enablers, intermediaries and users. Knowledge producers might include universities and other research institutions, think-tanks, technological developers, national statistics and data agencies. Knowledge enablers will include government and regulatory authorities, appropriate legal and policy frameworks, and strong systems to fund research, technology and innovation. Knowledge users include different government departments, legislators, industry and the private sector and regulatory bodies, with different emphases based on research or innovation. The boxes outside these spheres show the system outputs. The importance of each of these outputs to development will vary from the macro-economic, capacity of the intuitions and political priorities for investments in each country.
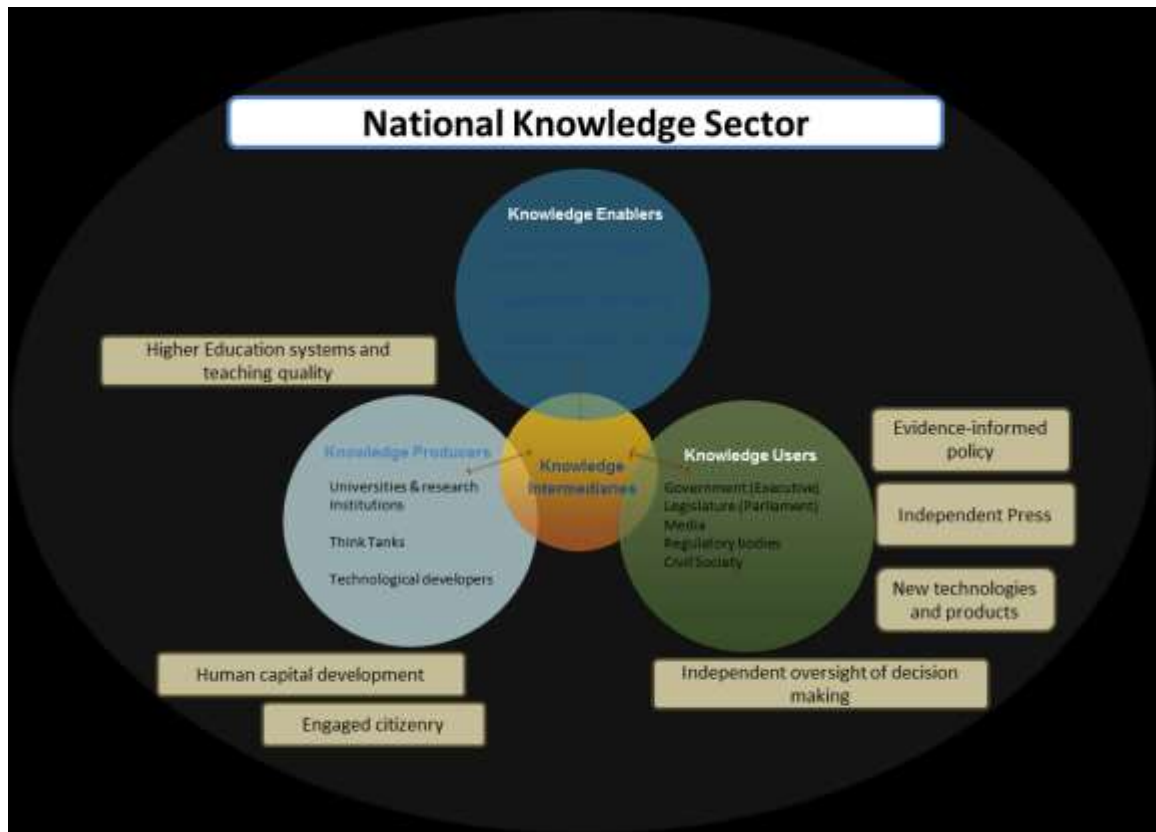
Figure 1: This diagram illustrates different components of a national knowledge system and their interactions. There are a number of ways to represent a national knowledge system. This diagram is adapted from a 'Triple Helix' model of a national innovation system and assumes the Quadruple and Quintuple updates to this model [xv].

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[i] By the end of 2010, at least 37 countries either had adopted new STI policies, or were formulating new ones.

[ii] This TOR uses the term 'knowledge system' throughout so as not to suggest or imply a particular theoretical approach and to enable an open exploration of national 'systems' or ecosystems approaches to science, technology and innovation. The knowledge system actors are likely to include governments and national funding agencies, higher education and academic institutions, R&D/innovation performers, industry and civil society. It is expected that the development of the concept and theory of change for investments in Kenya, Tanzania and Rwanda will be based on a robust review of international evidence on national innovation systems and research ecosystems, and build on this. This conceptual approach may for example expand an existing theory for national innovation systems, or research systems. In doing so the research will need to consider that the knowledge system may not be considered to be fully developed in Kenya, Tanzania and Rwanda if applying an exisiting framework normally applied to developed economies. For example much innovation research regards established formal sector firms and research and development (R&D) as the key drivers of innovation outcomes. But because innovative activities in developing countries typically occur in sectors in which R&D is not the main driver, such innovations may occur "below the radar" of traditional metrics. For this reason, this research should develop a consider an approach which is more applicable to these country settings and a methodology for understanding these innovations.

[iii] In developing the concept of knowledge systems applicable to Kenya, Rwanda and Tanzania, the Research team is encouraged to refer to the learning from the 2001 IDRC-funded programme 'Research on Knowledge Systems (RoKS)' (https://idl-bnc.idrc.ca/dspace/handle/10625/33783?mode=full)

[iv] The emphasis of this approach is to enable a practical understanding and discussions on the theory and evidence of what evidence of what works, and recommendations for Kenya, Rwanda and Tanzania, without assuming an academic understanding of these amongst policy makers.

[v] Link and reference to published PEAKS desk review (https://partnerplatform.org/eps-peaks)

[vi] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291982/HTN-strength-evidence-march2014.pdf

[vii] DFID, 2009. Political Economy Analysis How to Note. Accessed at http://www.gsdrc.org/docs/open/PO58.pdf

[viii] World Bank How to notes on political economy assessments at sector and project level. Accessed at http://www.gsdrc.org/docs/open/PE1.pdf

[ix] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/200088/Research_uptake_guidance.pdf

[x] https://www.gov.uk/dfid-research-outputs

[xi] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67483/dfid-ethics-prcpls-rsrch-eval.pdf

[xii] http://insight/MoneySight/Procurement/Planning-a-procurement/Other-key-issues-to-consider/Pages/Duty-of-care-to-suppliers.aspx

[xiii] http://www.sgciafrica.org/

[xiv] http://aesa.ac.ke/

[xv] This diagram is adapted from the 'Triple Helix' model that the university-industry-government relationship is the basis for innovation and development in a knowledge based economy. Arrangements and networks among these three institutional spheres provide the transaction space to support evidence-based policy and innovation processes. The Triple Helix analytical framework has been applied to systems of innovation for industry and growth. In this adaptation, the industry sphere has been extended to encompass other areas of development and wider users of new knowledge within the research system. The Triple Helix innovation model focuses on university-industry-government relations and is compatible with the *knowledge economy*. This concept has been further developed by adding as a fourth helix the 'media-based and culture-based public' and 'civil society' (the Quadruple Helix). The Quadruple Helix adds the dimension of the *knowledge society* and *knowledge democracy* for knowledge production and innovation. A further Quintuple Helix adds the 'natural environments of society' and is ecologically sensitive. (In Carayannis EG, Barth TD and Campbell DFJ (2012) The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. Journal of Innovation and Entrepreneurship A Systems View Across Time and Space 2012**1**:2)

Annex A

DFID Overall Country Risk Assessment matrix - Location: **Kenya**

Theme	Risk Score	Risk Score	Risk Score
	Kenya (excluding areas listed separately)	**Advise against all but essential travel to within 15km of the coast from the Tana River down to the Sabaki River North of Malindi. It covers Lamu County and those areas of Tana River County north of the Tana river itself.**	**Advise against all but essential travel to Mandera, Daadab and Garissa plus anywhere else within 60km of the Somali border (including areas North of Pate Island on the coast)[xv] and Eastleigh in Nairobi**
OVERALL RATING	4	5	5
FCO travel advice	4	5	5
Host nation travel advice	Not available	Not available	Not available
Transportation	4	4	4
Security	4	5	5
Civil unrest	4	4	5
Violence/crime	4	4	5
Terrorism	4	5	5
Espionage	4	2	2
War	1	1	3
Hurricane	1	1	1
Earthquake	1	1	1
Flood	3	3	3
Medical Services	4	3	3

1 Very Low risk	2 Low risk	3 Med risk	4 High risk	5 Very High risk
			SIGNIFICANTLY GREATER THAN NORMAL RISK	

Rwanda-provisional risk rating

Theme	Northern Province	Eastern Province	Southern Province	Western Province	Kigali Province	OVERALL
Overall Rating	2	2	2	2	2	2

FCO Travel Advice	2	2	2	3	2	2
Host Nation Travel Advice	Not available					
Transportation	2	2	2	2	1	2
	Do not recommend driving at night in rural areas due to poorly lit roads, dense population, untethered livestock, variable condition of vehicles.					
Security	2	2	2	2	2	2
				Potential for security to deteriorate depending on events over the border in Burundi.	Potential for security to deteriorate depending on events over the border in DRC.	
Civil Unrest	1	1	1	1	1	1
Violence/Crime	2	2	3	3	2	2
				Reports of criminal gangs operating on Burundi border.		
Terrorism	1	1	1	1	2	1
War	1	1	2	2	1	1
				Possible spillover from events in Burundi	Depends on events on DRC side of border.	
Earthquake	3	3	3	3	3	3
Flood	3	3	3	3	2	2
	Risk is to rural infrastructure: roads, power, and poorly constructed domestic dwellings. Rains are seasonal: Feb to June and Sep to Dec.					
Medical Services	3	3	3	3	2	3

Tanzania provisional risk rating

Theme	DFID Risk score	DFID Risk score
Geographical remit of programme is Dar es Salaam and Zanzibar and hence overall rating is 3 Medium	**Dar es Salaam only**	**Whole of the country (including Dar)**

Contract Section 3: Terms of Reference

OVERALL RATING	2 Low (1 rating x 3; 2 rating x 5; 3 rating x 3; 4 rating x 1 with score for project / intervention to be added)	3 Medium (1 rating x 3; 2 rating x 2; 3 rating x 6; 4 rating x 1 with score for project / intervention to be added)
FCO travel advice	1	1
Host nation travel advice	Not available	Not available
Transportation	2	3
Security	3*	3*
Civil unrest	2	2
Violence/crime	4*	4*
Espionage	(2 or) 3 *	(2 or) 3 *
Terrorism	3*	3*
War	1	1
Hurricane	1	1
Earthquake	2	3
Flood	2	2
Medical Services	2	3
Nature of Project / Intervention		