Science and Innovation for Delivering the 2030 Agenda for Sustainable Development:

Provocation for Discussion

Nairobi, Kenya
March 2017

Paul van Gardingen
Visiting Professor of International Development
The University of Leicester

Vice Chancellor's Office
The University of Leicester
University Road
Leicester LE1 7RH

Email: pvg1@le.ac.uk
Web: www.le.ac.uk

Table of Contents

Abbreviations

Abbreviation	Definition
AGRA	Alliance for a Green Revolution in Africa
AU	African Union
DAC	Development Assistance Community
DC	Developing Country
DFID	Department for International Development (UK)
DH	Department of Health (UK)
ESPA	Ecosystem Services for Poverty Alleviation (UK research programme)
GAVI	Global Alliance for Vaccines and Immunisation
GCRF	Global Challenges Research Fund
HEFCE	Higher Education Funding Council for England
ICSU	International Council for Science
IDRC	International Development Research Centre (Canada)
IGBP	International Geosphere Biosphere Programme
IHDP	International Human Dimensions Programme
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
KFPE	Swiss Commission for Research Partnerships with Developing Countries
MDGs	Millennium Development Goals
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organisation
NIHR	National Institute of Health Research (UK)
NYAS	New York Academy of Sciences
ODA	Official Development Assistance
OECD	Organisation of Economic Cooperation and Development
SDGs	Sustainable Development Goals
STI	Science, Technology and Innovation
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development (1992)
UNCSD	United Nations Conference on Sustainable Development (2012)
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations Office for Disaster Risk Reduction
UNSG	Secretary-General of United Nations
WCRP	World Climate Research Programme
KFPE	Swiss Commission on Research Partnerships with Developing Countries
ToC	Theory of Change
ODI	Overseas Development Institute
RAPID	Research and Policy in Development (RAPID) programme
WHO	World Health Organisation

1   Introduction

1.1   Background

1.1.1   This provocation paper is intended to support discussions, at a 2-day workshop in Nairobi in March 2017, by experts of ways to enhance the contribution of science, technology and innovation to the delivery of the United Nation's 2030 Global Goals.

1.1.2   On September 25th, 2015, the General Assembly of the United Nations (UN) adopted a set of 17 Sustainable Development Goals (SDGs) to frame an ambitious, comprehensive and universal agenda of sustainable development for global society (UN 2015c). During 2015, a series of events defined a new global 'consensus' or agenda for global development up to 2030. In addition to the SDGs being agreed in September, the UN Framework Convention on Climate Change (UNFCCC) produced the Paris Agreement in December (UNFCCC 2015); the UN Office for Disaster Risk Reduction (UNISDR) agreed the Sendai Framework in March (UNISDR 2015); and, in July, the Third International Conference on Financing for Development agreed the Addis Ababa Action Agenda (UN 2015a).

> Most global discussion about the 2030 development agenda is currently focused on the Sustainable Development Goals.   While the SDGs are relatively comprehensive, it is important that our discussion of STI for sustainable development also considers the three other relevant 2015 agreements namely:
>
> - UNFCCC Paris Agreement
>
> - UNISDR Sendai Framework
>
> - Addis Ababa Action Agenda
>   (Third International Conference on Financing for Development)

1.1.3   The SDGs and the Global Goals build upon many decades of political progress linking society, economy and environment from the early 1970s (Section 2). While the SDGs are often presented as the successor to the UN's previous Millennium Declaration (UN 2000) and Millennium Development Goals (UN 2001) their origins can be traced to the 1972 "Stockholm" UN Conference on Human Development (UN 1972), through the "Rio" UN Conference on Environment and Development (Agenda 21: UNCED 1992) and finally the "Rio+20" UN Conference on Sustainable Development (The future we want: UNCSD 2012).

1.1.4   Continuous dialogue and research has taken place within the scientific community running parallel to the discourse in the UN and member states. This process has engaged virtually all disciplines producing research results that address the development agenda as it has evolved.

1.1.5   There have been examples where research has been able to address key development themes and processes. These have included global processes such as the role of the Intergovernmental Panel on Climate Change (IPCC) on climate change negotiations through the UN Framework Convention on Climate Change (UNFCCC) and the way that the UN's Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005) and subsequent research contributed to the creation of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

1.1.6   The impact of the direct application of research to address key development or global challenges over the same period will be of much more cumulative significance. Virtually all of the major development impacts celebrated in 2015, at the end of the MDGs, can be linked to benefits derived from research or science, technology and innovation. This in turn has led to the recognition that systems linking science, technology and innovation must be central to the delivery on the SDGs leading up to 2030.

1.1.7   Governments, development agencies and major foundations around the world have demonstrated their willingness to make very significant new research investments to support

the SDGs. They are asking the research community to adopt new ways of working. This includes a shift to research questions focussed on addressing significant remaining (Grand or Global) challenges that have the potential to produce benefits or impacts at significant scale. There is also an expectation that research will increasingly be required to be delivered involving interdisciplinary teams, usually delivered through international partnerships. While these high-level objectives are generally agreed (e.g.UN 2015b), there is still much debate about how best to achieve success in terms of more detailed plans for implementation.

Three Key Questions:

1. How do we best identify and ask the questions that are needed to guide research that provides transformational change for sustainable development?

2. What good (or best) practice can be adopted by researchers, institutions and funders to create relationships that deliver research to drive transformational change for sustainable development?

3. Which processes, approaches and investments are most likely to take successful research and build impact at scale (Theory of Change)?

Box 1   Three key questions linking science, technology and innovation to future sustainable development

1.2   Context: our approach and focus

1.2.1   The approach that the University of Leicester has adopted for this workshop will build upon the content of this provocation paper to draw upon the experience of all participants. Some of the initial discussion will feature examples based on approaches and funding for development research from the United Kingdom but the organisers wish to draw upon the much wider pool of experience available involving other countries during the event.

1.2.2   One of the examples to be used in this workshop will be the UK's Ecosystem Services for Poverty Alleviation (ESPA) programme (www.espa.ac.uk). At the time that it was first established (2007) it was seen as an innovative (and challenging) research programme that was designed to work in new ways to promote impact-focused research responding to key global development challenges (The Millennium Development Goals (UN 2001) and the Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005)). ESPA designed and commissioned research which promoted interdisciplinary research, through international partnerships. ESPA took specific actions intended to empower developing country researchers to take on leadership roles in their projects which are now recognised as having been beneficial (Blicharska *et al.* 2017). ESPA's approach, built upon examples of best practice from other programmes at that time (specifically IDRC's [Ecohealth programme](#)), has subsequently informed practice in several research programmes that were developed in later years.

1.2.3   The broader context of this workshop is a response to a very significantly changing environment for development research funded by the United Kingdom. These changes were announced in 2015 as part of the UK's new Aid Strategy (HM Treasury and DFID 2015). The 2015 Strategy led to very significantly increased investment in development science and research to meet the needs of developing countries, specifically those on the Organisation of Economic Cooperation and Development's (OECD) Development Assistance Committee's (DAC) list of Official Development Assistance (ODA) eligible countries (often referred to as [the DAC list](#)).

1.2.4   The largest new development research programme launched by the UK Government has been the Global Challenges Research Fund ([GCRF](#)). This fund has a core requirement that research needs to address significant development challenges of relevance to one or more countries on the OECD DAC list and using research approaches that are consistent with OECD's definition of eligibility for the funding to be considered as Official Development Assistance (Annex 2). The implementation of GCRF and the development of its ways of

working are still under development. A GCRF Strategy is expected to be published during 2017.

1.2.5   In October 2016, a workshop was convened at Wilton Park of the topic "Knowledge for development: optimising development impact through investments in research". It aimed to inform how the UK can optimise the impact and sustainability of development outcomes through the GCRF. Three core questions were addressed at the meeting:

- How do we ensure that the GCRF is focused on the right development challenges?

- What approaches to research procurement, partnerships and management will drive impact?

- How can the GCRF make a sustained contribution to building capacity and capability for research in developing countries?

1.2.6   The outcome document from the Wilton Park event (Wilton Park 2016) made a number of high-level recommendations for the GCRF, but many of these could be considered relevant more widely to other development research programmes. The Wilton Park event was also not able to cover some of the emerging issues in sufficient depth. The current workshop on "Science and Innovation for Delivering the 2030 Agenda for Sustainable Development" has been designed to pick up on the themes that emerged from the Wilton Park event.

> This workshop has been designed to follow-up on key themes that emerged from the Wilton Park event held in October 2015 on "Knowledge for development: optimising development impact through investments in research".
>
> While the Wilton Park event was largely focused on the UK's new Global Challenges Research Fund, the outcomes from both events are seen to be applicable more broadly across the range of new investments in science, technology and innovation for sustainable development.

1.2.7   The event location and invited participants bring together individuals from Kenya and other African nations with those from the United Kingdom (largely the University of Leicester). This grouping is intended to focus on how science, technology and innovation can be used to meet the needs of Africa's diverse nations and communities. The workshop is also intended to promote the development of partnerships (or longer term relationships) to deliver relevant research, linking participants and their institutions through international collaboration. Although there will be discussion of opportunities through the UK's new investments in development research, it is not intended that the workshop or its outcomes should be restricted to these programmes.

1.2.8   The results derived from the workshop will be of global relevance and shared widely. In addition, lessons will be extracted to inform current debate within the United Kingdom as institutions there go through a period of rapid expansion and change in its own national system of science, technology and innovation (STI). It is expected that this process will contribute to further enhancing the value of UK institutions and researchers as international partners for STI for sustainable development.

1.2.9   The workshop will use three interlinked sessions to explore the challenges (provocations) identified in this report, and a series of questions linked to these. They are identified in this report as **Qn.n**. It is intended that participants will have the option to join small, short-term working groups to explore these issues as a follow-up process to the meeting.

2 Science, Technology and Innovation for Sustainable Development. A Sixty Year Journey of Transformative Change

2.1.1 Research, science, technology and innovation (STI) have been a part of the global dialogue on sustainable development since the early 1970s and will be required to underpin progress towards the 2030 target for the SDGs (Figure 1). A number of major international research and scientific processes supported global dialogue during the twenty years from the Stockholm Conference on the Human Environment, through to the Rio Conference on Environment and Development. Of these, the substantive, World Commission on Sustainable Development ("Our Common Future", UNCED 1987) provided a summary of existing knowledge and perhaps more critically an assessment of future priorities for both research and development. These, along with substantive scientific input from the International Council for Science (ICSU) helped to set the priorities for research in the period following the Rio meeting.

2.1.2 The benefit of having a well-defined strategic agenda for research can be seen in some of the STI initiatives that addressed themes contained in Agenda 21 (UNCED 1992). Internationally, a set of programmes were coordinated through ICSU, which included the International Biosphere Geosphere Programme (IGBP), World Climate Research Programme (WCRP), International Human Dimensions Programme (IHDP) and Diversitas. These programmes ran until 2015, when they merged to form the FutureEarth initiative. There were also major national research investments aligned with the agenda. In the United Kingdom, the Overseas Development Administration (which became the Department for International Development) created a major strategic investment through the Renewable Natural Resources Research Strategy running from 1995 through 2007.

2.1.3 There was much less strategic scientific input for the development of the UN's Millennium Declaration (UN 2000) and SDGS (UN 2001). The high-level scientific inputs came once the UN had agreed the SDGs and most targets. Some commentators would argue that the lack of scientific input contributed to some of the resulting weaknesses of the Goals (e.g. gaps and the disjoined nature of the SDGs).

2.1.4 The strategic approach to identify research needs for the SDGs came in the years immediately after they were agreed by the UN. One such example, was the Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005) which has been highly influential in linking STI and development over the following decade. In addition to international efforts, a number of national priority setting processes were carried out, including the UK's Department for International Development which made a commitment to a significant increase in development research as part of their first development research strategy covering the period 2008-2013 (DFID 2008).

2.1.5 The MDGs provided the focus to co-ordinate research efforts to address a number of strategic challenges for development. One positive outcome from the MDGs was the shift towards enhancing the co-ordination (or at least alignment) of research efforts at national, international and multilateral levels. This included major stakeholders including national funding agencies, Foundations (e.g. Gates, Rockefeller), International NGOs and regional or international agencies such as the African Union / New Partnership for Africa's Development (AU/NEPAD), the World Health Organisation (WHO) and the Consultative Group on International Agriculture Research. In addition, new and very significant initiatives came into existence, such as Alliance for a Green Revolution in Africa (AGRA) and the Global Alliance for Vaccines and Immunisation (GAVI). This list is not intended to be comprehensive, but instead is used to illustrate how the MDGs galvanised new ways of working and new relationships designed to use science to address the major global challenges encapsulated by the MDGs.

> This paper argues that similar efforts are needed to identify the most important strategic research questions required to deliver the SDGs
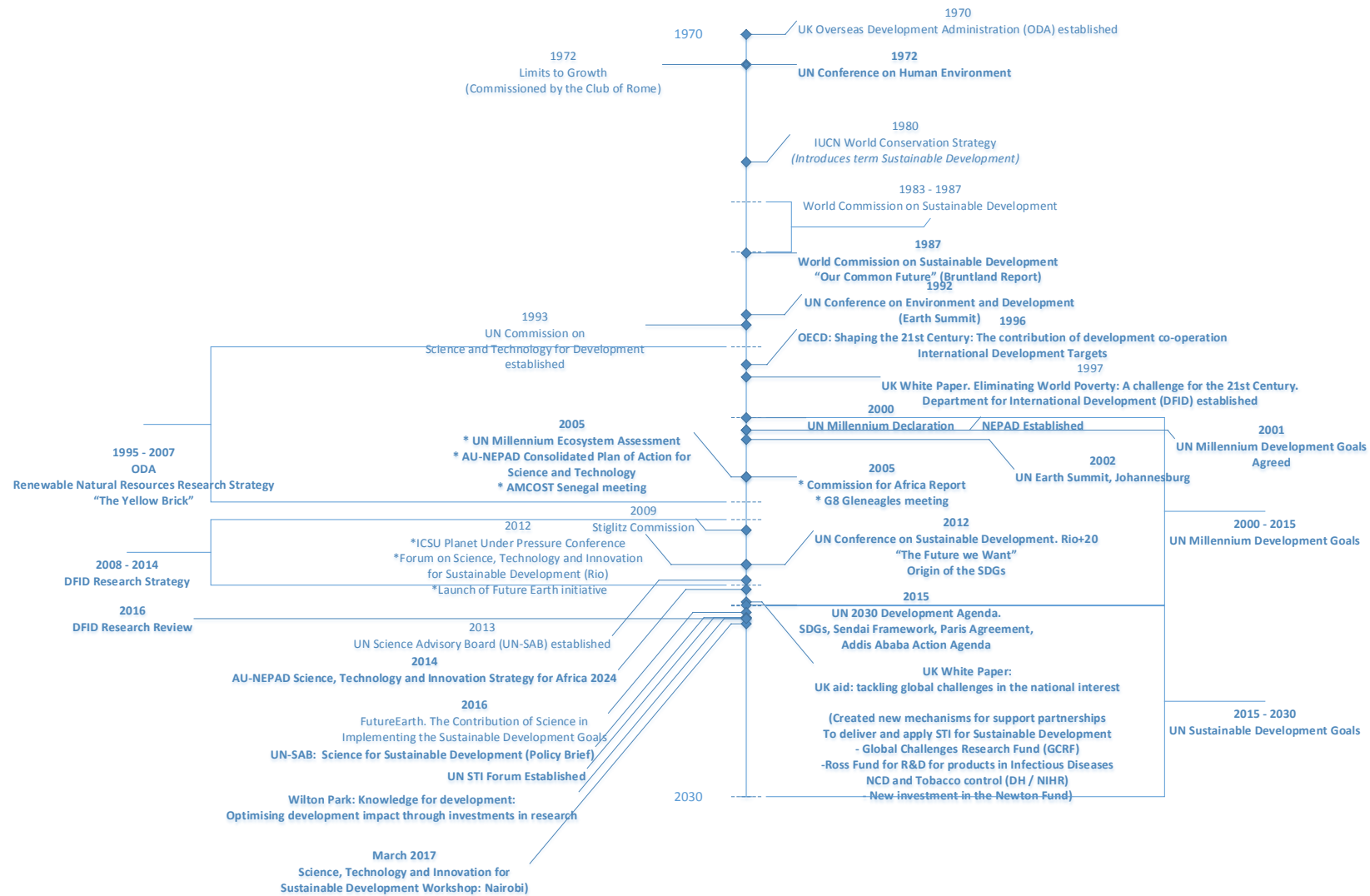
Figure 1   A timeline linking global science, technology and innovation with international and sustainable development (1970-2030). Events on the left of the diagram relate to STI, with key drivers of international and sustainable development on the right.

3   Priority Science Questions for the SDGs and 2030 Agenda

3.1   Introduction

3.1.1   One of the key questions highlighted as part of the Wilton Park event on the GCRF was "How do we ensure that the GCRF is focused on the right development challenges?". This question remained unanswered.

3.1.2   A comprehensive review of the literature covering both academic and grey-literature sources undertaken to inform this provocation paper was unable to locate any significant documents that clearly articulate the high-level scientific questions that emerge from the analysis of what would be needed to deliver the new global challenges encapsulated through SDGs.

3.1.3   There are many documents that have taken pre-existing demand-led priorities and re-framed them to align with the SDGs and also the supply side where researchers set out how their pre-existing research ideas might be relevant to the SDGs.

3.1.4   The gap in knowledge seems to be an analysis that starts with the 2030 development agenda, and asks potential beneficiaries what transformational science would be required to deliver enhanced sustainable development at scale by 2030, especially within the context of the needs of developing countries.

> **Provocation 1**
>
> **There is no effective or comprehensive strategic analysis of the science needed to deliver the 2030 agenda for sustainable development.**
>
> *It is suggested that having such analysis would significantly enhance development impact through future investments in research.*

Box 2   Provocation 1: Are we asking the "right strategic questions"?

3.2   Pre-existing analysis of key research questions for the SDGs

3.2.1   The preparation for this workshop has reviewed existing documentation, but it is recognised that this is not yet comprehensive and has not benefitted from the final outcomes of ongoing analysis such as the GCRF Strategy and a Bellagio meeting held in November 2016.

3.2.2   There are documents that respond directly to the SDGs, but these tend to be either high-level or of restricted focus. One of the most important high-level analysis is the policy brief on science for sustainable development produced by the Science Advisory Board to the UN's Secretary General (Scientific Advisory Board of the UNSG 2016). This provides very useful high level principles on how science should contribute, but has no discussion of specific research questions.

3.2.3   The 2016 UNESCO Science report, "Towards 2030" UNESCO 2030 (UNESCO 2016) provides a very comprehensive overview of global science and its relevance to the 2030 Agenda, but has limited analysis of strategic priorities or detail. The report of a workshop arranged by the New York Academy of Science (NYAS) (Costley 2016), was commissioned in response to the challenges raised by the Science Advisory Board to the UN's Secretary General, but again, the report has limited detail on specific priorities, covering a subset of themes in the 2030 Agenda. In addition, the NYAS seems to have had very limited representation of participants from developing countries.

3.2.4   There are a number of publications that have produced research questions that are relevant to the SDGs, some of which predate the formal 2015 agreement. Most represent a subset of global challenges, either regionally, such as the African Union's Science, Technology and Innovation Strategy for Africa 2014 (African Union Commission 2014), or thematically, such as Future Earth's strategic research agenda (Future Earth 2014).

3.2.5　There have been numerous publications describing potential research questions following the agreement of the SDGs, but these have almost entirely been focused on a subset of the high-level Goals, representing a particular process or community and have largely been prepared by the scientific community. The comments of the Scientific Advisory Board to UN's Secretary General in 2016 states "*After the adoption of the Agenda 2030 and the SDGs, it remains paramount to identify critical research priorities*" and suggests that "*Scientists should systematically identify critical knowledge gaps and actively contribute to efforts aimed at formulating new research agendas at the subnational, national, regional and global levels oriented at questions of sustainability.*" (Scientific Advisory Board of the UNSG 2016)*.*

3.2.6　A key question that emerges from this statement is how this process should be undertaken and the role of other key stakeholders including specifically those with the potential to apply the resulting research (the demand-side).

> ***Q1.1　Are there pre-existing integrated analyses of the core strategic science questions required to deliver the 2030 development agenda?***

3.3　The benefits of a strategic, demand-focused approach

3.3.1　Research supporting the implementation of the SDGs provides some examples of the benefits of adopting a strategic and demand focused approach to setting research questions. The UK's ESPA programme provides one useful case study. The ESPA programme was designed from the outset to address a set of global challenges linking ecosystem services and poverty alleviation, effectively at the intersection of the MDGs and the Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005). The programme established an initial, strategically focused Programme Advisory Committee that guided the commissioning of a set of ESPA Situation Analyses that helped to assess (a) the current state of knowledge (b) demand for new knowledge and (c) to identify and engage research partners in developing countries to participate in the programme. This information was then used to develop the high-level scientific objectives of the programme and the associated ESPA Research Framework that informed the commissioning of over £30 million of new interdisciplinary research. This was supported by a range of other material including a "what is poverty" guide on to build impact in research.

3.4   Improving our focus on the "right questions" for the 2030 Agenda

3.4.1   The ESPA example is provided to illustrate one possible approach to defining strategic research questions. It is recognised that they are several other good examples and a range of approaches. When these are examined some basic principles start to emerge (Box 3) and could be used to define strategic research questions for the SDGs.

1. Identify the key strategic challenges that require the application of science and technology
2. Review pre-existing knowledge, science and technology and consider how this might be adapted to address the key strategic challenges
3. Engage potential users to help define the key research questions (*demand side*)
4. Review recent technical and intellectual advances that may be relevant and potentially transformational (*supply side)*
5. Identify important science, technology and innovation gaps in pre-existing knowledge and prioritise those which: - can be addressed through new research, *and* - have the potential to produce results which could be applied to sustainably transform lives at scale

Box 3   An initial set of basic principles that can inform the development of a strategic research framework for the 2030 Agenda

Q1.2   What approaches could be used to develop and collate the global research community with a set of strategic and transformational research questions that are required to implement the SDGs?

4 Building Effective and Equitable Long-Term Relationships

4.1 Why does partnership matter?

4.1.1 It is widely accepted that effective and equitable partnerships will be a core component of the way that research is implemented to addresses key global development challenges. This was highlighted in the recent policy brief of the UN's Scientific Advisory Board (Scientific Advisory Board of the UNSG 2016) and has been central to the development of new research initiatives, including those funded in the UK. The Wilton Park event on the UK's new Global Challenges Research Fund (GCRF) highlighted this as a key requirement (Wilton Park 2016) stating that "*A strong and equitable relationship between UK research institutions and developing country partners is fundamental to the success and sustainability of the GCRF*". There is an implicit recognition in these recent reports that more should be done to ensure research relationships are as effective and successful as possible.

Provocation 2

Current approaches to designing, commissioning, implementing and applying research for development usually lead to relationships that are not as effective and/or equitable as they need to be.

It is suggested that very significant improvements can be made to build more effective and equitable relationships for future research investments and that this will enhance the potential for transformative impact at scale.

Box 4   Provocation 2. Current approaches to partnership in research for development need to change

4.2 What do we know that works?

4.2.1 Research addressing major global development challenges is not new, there is decades of experience and there has been some analysis of the benefits of international and interdisciplinary partnerships. There is also a growing recognition of the need to engage potential research users at all stages of the research and innovation process and link this to a research process that can span traditional disciplinary boundaries, often referred to as transdisciplinary research[1].

4.2.2 There are, however, relatively few published summaries of good practice. One of the most comprehensive reports was first produced by the Swiss Commission for Research Partnerships with Developing Countries (KFPE) in 2012 and updated in 2014 (Stöckli, Wiesmann and Lys 2014). This report describes 11 principles and 7 questions that researchers should consider when developing transboundary partnerships. The approach suggested in the KFPE report are relevant to all disciplines and types of research, but may not yet be fully comprehensive.

4.2.3 The global health research community has also been active in documenting aspects of good practice for health research partnerships in developing countries, much of which has been collated by the Council of Health Research for Development (http://www.cohred.org/) and their associated initiative, the Research Fairness Initiative (http://rfi.cohred.org/) which focuses on making partnerships more effective in the health research sector.

4.2.4 There is an increasing recognition that the way in which research is commissioned by research funders is another aspect of partnership that can have very significant impact on research effectiveness and impact (e.g. Blicharska *et al.* 2017). However, there seems to have been very limited analysis or comparison of the benefits or challenges associated with the approaches adopted by different funders or even programmes.

4.2.5 The ESPA programme commissioned one of the few reviews of experiences of commissioning interdisciplinary research comparing experience from the first set of major

---

[1] This definition is contested by some groups.

research calls issued by the programme (Meagher and Lyall 2013). This review concluded that the way in which research funders commission interdisciplinary research can have an important impact on the nature of resulting partnerships and the quality of research and expected impact. It was suggested that research funders should do more to learn lessons from programmes such as ESPA. These conclusions speak strongly to one of the key questions emerging from the Wilton Park event in 2016, suggesting that more needs to be done in this area.

4.3   What has changed since 2000 and the MDGs?

4.3.1   The nature of research activities and partnerships also tend to reflect social, economic and technological changes in the wider society and economy. These changes mean that the types of partnerships and the way that they can work to address the SDGs between 2015 and 2030, will differ in significant ways from the research partnerships addressing the MDGs between 2000 and 2015. Some of the key changes are listed below (Box 5).

4.3.2   It is recognised that this list is not comprehensive and participants at the workshop are encouraged to fill in any significant omissions

---

**Key Social, Technological and Economic Changes
Relevant to Research for Development Between 2000 and 2015**

- Economic growth in most developing countries
  (enabling innovation and investment in science)

- Enhanced human capacity for science, technology and innovation in developing countries

- Enhanced institutional capacity in developing countries to participate in international research for development

- Enhanced focus on impact and innovation in developing science

- New research funding agencies / systems in many developing countries and associated growth in national investment

- Growth of involvement by the private sector and civil society applying STI for development

- Significant investments in national research infrastructure in many developing countries

- Growth of supporting infrastructure, especially communications in information technology

- New regional bodies supporting STI for development (e.g. NEPAD) and enhanced engagement by emerging economies (e.g. China, Brazil, India, South Africa)

- Significant technological and methodological advances in nearly all scientific disciplines

- Growth in the application of interdisciplinary science, complexity and big data

---

Box 5   Key social, technological and economic changes 2000-2015

4.3.3   While there has been significant progress when compared with the start of the MDG period, it is suggested here, that there is no justification for complacency. It is suggested that building effective partnerships to deliver science for the 2030 Agenda will require more core investment in researchers and research institutions in developing countries as well as research funders and developed country researchers adopting better practice to promote more effective and equitable partnerships.

4.4   Changing the way that we work in partnership

4.4.1   The analysis in this section suggests that more can and should be done to promote more effective and equitable partnerships. Workshop participants will be asked to consider the following questions.

> **Q 2.1   What fundamental principles contribute to building sustainable and equitable partnerships or relationships for STI to address key development challenges?**
>
> **Q 2.2   Are there additional guidelines or other examples of good practice that could be used to produce more comprehensive guidance on good practice for partnerships?**
>
> **Q 2.3   What key changes are required in the way that key stakeholders engage and work in partnership to support STI for development? What are the challenges:**
> **- for researchers?**
> **- for research institutions?**
> **- for research funders?**
> **- for knowledge intermediaries and users of research?**
>
> **Q 2.4   What are the key capacity development objectives that are required?**
>
> **Q 2.5   What additional investments might be required to build more effective and equitable partnerships?**
> **(e.g. capacity development, research or innovation infrastructure)**

5 Building Impact at Scale

5.1 The Research Impact Agenda

5.1.1 Virtually all major research funders now expect applicants and funded projects to show how investment in research leads to a range of benefits to society as well as academic outcomes. The way that these expectations are articulated varies significantly, as do the types of desired outcomes that are considered to be societal impacts. When considering development research, it is often the case that researchers are required to link their expected impacts to priorities described in the MDGs and, since 2015, the SDGs. There is an expectation that development research will be designed in a way that has the potential to produce benefits for society. This is especially important for government-funded research which is accounted as Official Development Assistance (ODA). While virtually all funders of development research expect to see results (and impact) within their overall portfolio of research investments, what they expect of individual projects can vary in terms of the scale and types of expected impact, when impact is expected (e.g. during the lifetime of a project or after projects have closed) and even if all funded projects are expected to demonstrate impact.

5.1.2 Development research projects have tended to use approaches of conceptualising, building and measuring impact that have been adapted from mainstream development activities. From the 1990s, many projects were expected to produce logical frameworks. From soon after the millennium, projects have been asked to produce a Theory of Change (ToC). With the advent of the SDGs, their universality and expansion of activities, there are a growing number researchers working in development research who have very limited understanding of what is expected in terms of impact from development-focused research.

Provocation 3

Some funders of development research are failing to articulate their expectations for impact and the degree that individual projects are expected to contribute during their lifetime.

Many researchers do not yet understand the contribution that they need to make to build impact and how they need to work with others to deliver sustainable impact at scale after their projects are complete.

The main reason for these challenges seems likely to be new types of funders, funding schemes and researchers becoming far more involved in development research. In the UK, the UK Research Councils have replaced DFID as having the largest proportion of the overall government budget for development (ODA) research

---

Box 6   Provocation 3. Expectations for impact are unclear!

5.2 Learning from previous investments

5.2.1 There is almost universal agreement that development research needs to deliver results both for poor people in developing countries but increasingly also for other groups in global society. As suggested above, there seems to be much less agreement on what should be achieved and how to do this.

5.2.2 The impact agenda has been an important component of "traditional" development research for at least the last two decades. Lesson learning from these programmes has produced a range of resources, such as best practice guides and evaluation studies. When this material is examined it can been seen that one of the most common impact pathways has been to influence policy, though in some cases the links between policy change and improvements in human well-being are less well articulated. This may not just be a feature of development science since an analysis of impact case studies submitted to the UK's 2014 Research Excellence Framework also noted that influencing policy was one of the most commonly cited pathways to impact cited across all research disciplines undertaken by state-funded universities in the UK (King's College London and Digital Science 2015).

5.2.3 There are several sets of guidance on how development research can inform development policy. In the United Kingdom, one of the most extensive sets has been produced by the Overseas Development Institute (ODI) through their Research and Policy in Development (RAPID) programme. This has now been further developed to become the Rapid Outcome Mapping Approach, ROMA www.roma.odi.org.

5.2.4 There is growing awareness that consideration of research impacts needs to extend beyond the frequent focus on influencing policy (King's College London and Digital Science 2015) to consider how research is put into use or turned into action. There are a range of programmes which have attempted this and participants in the workshop will be asked to share their experience of initiatives that have been productive.

5.3 Developing theories of change

5.3.1 Over the past decade Theories of Change (ToC) have been used by the development community as a way to design and implement activities in a way that enhances impact. ToCs can also provide a useful framework to track and evaluate the results from projects. A useful review of the application of ToC within the development context was produced for DFID (Vogel 2012).

5.3.2 The Wilton Park event in 2016 had a major theme of considering how to enhance and describe the impact resulting from the UK's Global Challenges Research Fund (Wilton Park 2016). One of the report's main conclusions is outlined below as Box 7.

> (Wilton Park) Recommendations
>
> …Develop a theory of change, at the highest level, describing how the GCRF will maximise impact (including through better development decisions, new technologies, stronger partnerships with the Global South and strengthening knowledge systems) so that research councils and institutions can appropriately design interventions to improve the quality and relevance of research.

Box 7 Recommendation from the Wilton Park event relating to the need to develop a high-level ToC for the UK's Global Challenges Research Fund (Wilton Park 2016).

5.4 ESPA's experience of conceptualising and building impact

5.4.1 The ESPA programme provides lessons that are potentially relevant to the design and implementation of major development research programmes that are addressing major global challenges (Meagher and Lyall 2013, Blicharska *et al.* 2017). In addition, ESPA's approach to building impact has been adapted for a number of other interdisciplinary research programmes.

5.4.2 ESPA's approach to impact was set out in a series of ESPA Impact Strategies. Early versions of ESPA's Strategy focused on how to design and implement impactful research, whilst the most recent (ESPA 2016) describes how the programme plans to build programme impact and presented a detailed Theory of Change to support this process (Figure 5). These documents also link with the programme's overall management document, its Logical Framework (ESPA 2014) which sets out the expected outcomes from the programme and details how some key dimensions of success will be measured

5.4.3 ESPA's initial approach to assisting researchers to build impact included identifying key activities that projects undertake and the relationships between research and uptake activities. These concepts have been adapted to support this workshop and are presented below as Figure 2 and Figure 3, respectively.
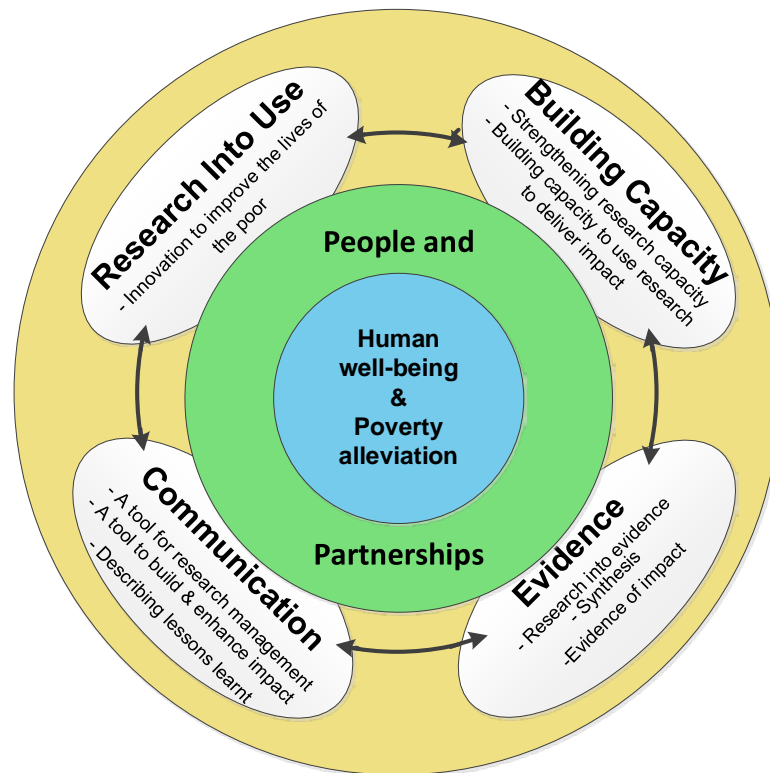
Figure 2   Core activities that development research projects can use to build impact.
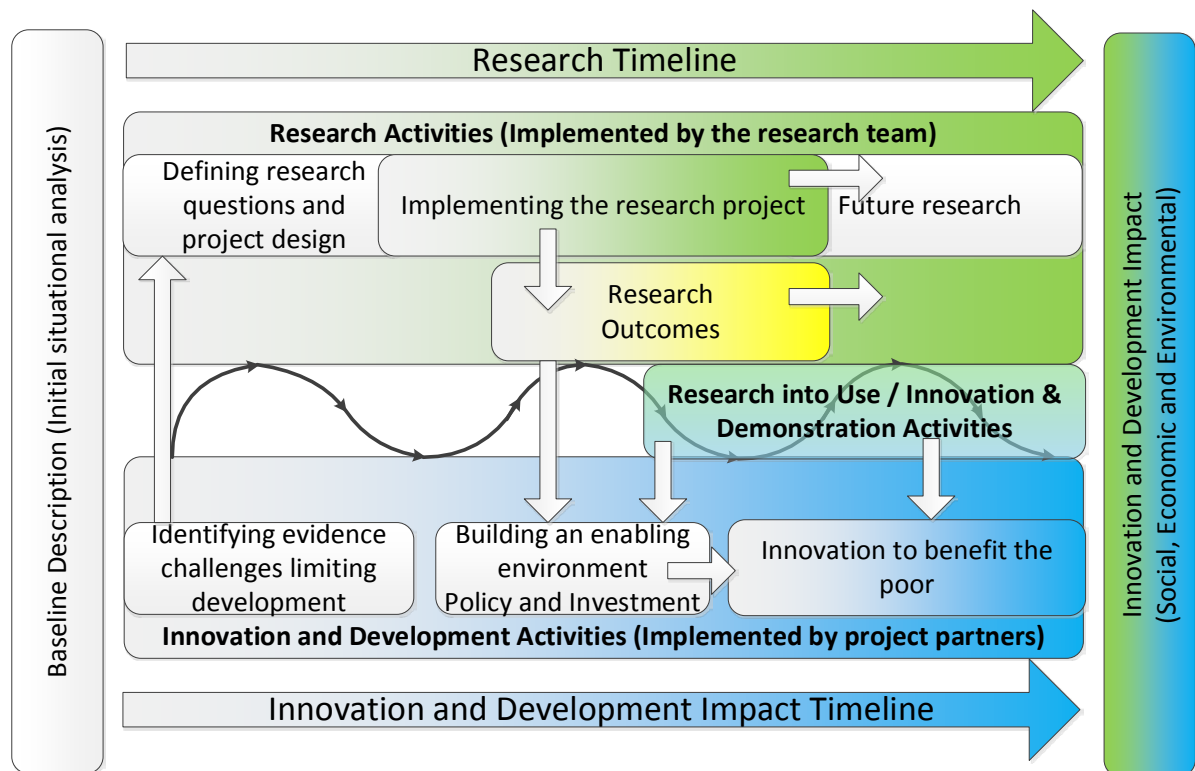Adapted from early guidance from the ESPA Programme.

Figure 3   Possible relationships between development research, innovation and impact.
Adapted from early guidance provided by the ESPA programme.

5.4.4   The most important aspect that emerged from ESPA was that research projects need to work with other groups to build development impact and that normally this will require a range of approaches. Another aspect that emerged as the programme progressed is that it is very rare for significant development impact to be attributable to single projects (or even programmes).
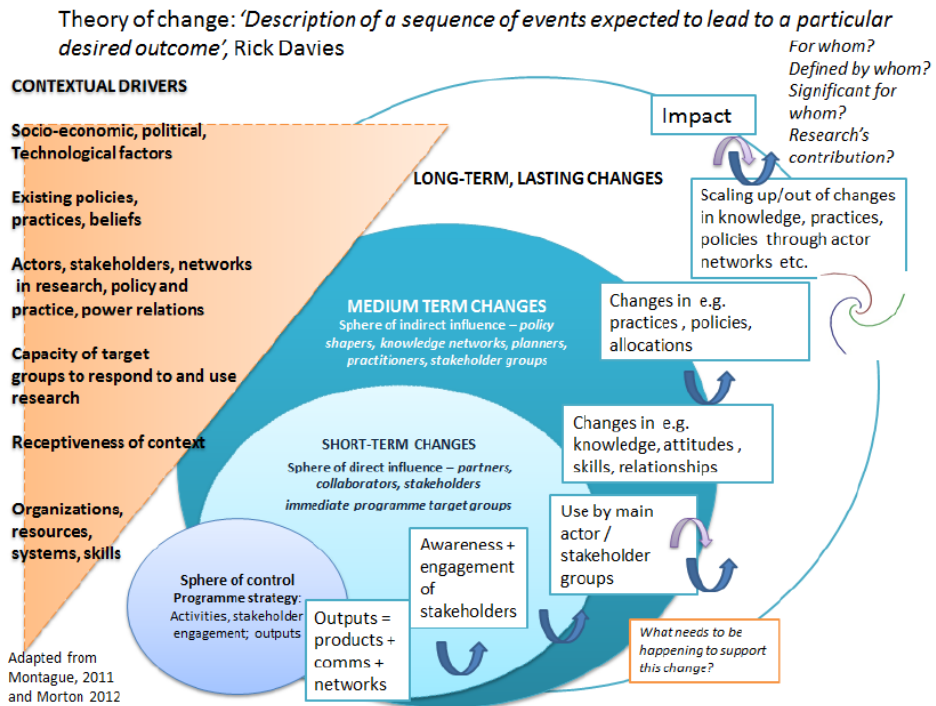
Figure 4 Generic Theory of Change developed for the ESPA programme to conceptualise how research programmes and projects build impact (Vogel 2013).

5.4.5 ESPA developed a programme level Theory of Change (Vogel 2013). This report included a diagram illustrating a generic approach for theory of change that could be adapted and applied by any development research project or programme (Figure 4). This approach was then used to develop a programme-level ToC published in 2016.
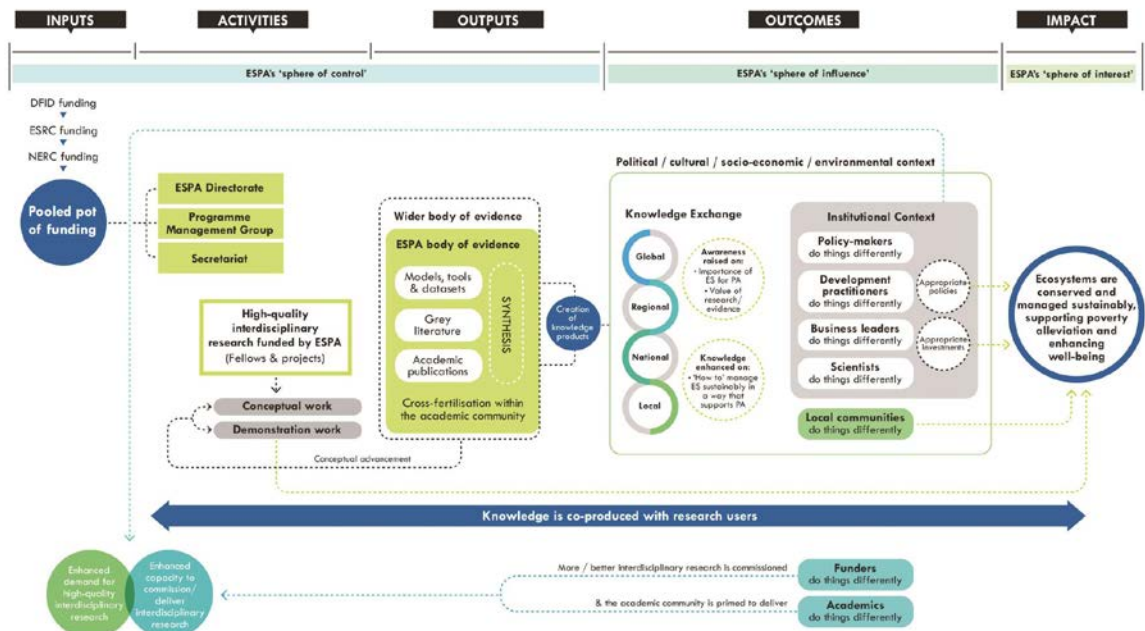

Figure 5 ESPA's Programme-level Theory of Change (ESPA 2016).

5.5 What can be done to enhance the impact of investments in development research and deliver impact at scale?

5.5.1 The Nairobi workshop will be asked to consider the following four questions relating to impact. In addition, participants will have the opportunity to suggest amendments to all of the diagrams used in this report to explore how development research projects and programmes can generate sustainable impact at scale.

Q 3.1 What could/should research funders do to articulate their expectations of impact in development research programmes?

Q 3.2 What could/should researchers do to further enhance the immediate impact of their projects and the potential for their results to contribute to impact at scale after projects have closed?

Q 3.3 What is needed to encourage funders and researchers to aim for types of impact that go beyond influencing policy?

Q 3.4 What approaches could/should be adopted or developed to build and enhance impact beyond what can be delivered by individual projects?

6 Science, Technology and Innovation Systems

6.1 Innovation for Development

6.1.1 There is very significant literature on the role of innovation for social and economic development in both developing and developed countries. It is beyond the scope of this report to review this literature. In addition to the academic literature, organisations such as the OECD (Organisation for Economic Cooperation and Development) have significant work programmes on innovation http://www.oecd.org/innovation/.

6.1.2 The discussion at the 2016 Wilton Park event (Wilton Park 2016) highlighted both the importance of innovation and knowledge systems to build impact from development science addressing global challenges (including the 2030 development agenda).

> **"Innovation and wider stakeholders**
>
> There were appeals for partnerships that produce innovation and move development challenges forward, for instance by placing more focus on the role of external actors, in particular the private sector, but also civil society, philanthropy and NGOs. Through bringing in further partnerships with wider stakeholders, the intention is that the GCRF can leverage these larger networks to deliver more impact. Many participants called for demand-driven research, relevant to current or future challenges. Innovations in research have to work with this wider range of partners who have the ability to take ideas to action, influence changes in policy and provide jobs."

Box 8   Comments on innovation from the Wilton Park event (Wilton Park 2016).

6.1.3 Figure 6 presents a framing of some of the key issues highlighted in this report to promote discussion at the Nairobi workshop relating to innovation for development.
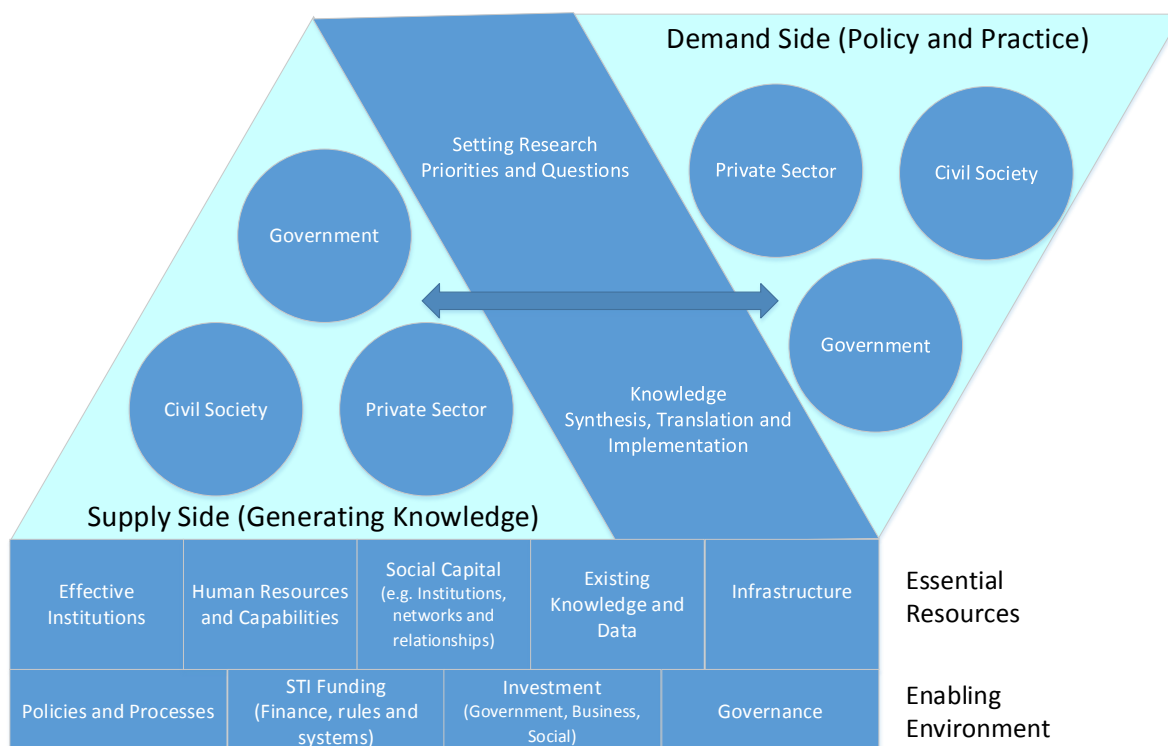

Figure 6   Framing some of the key issues emerging from this report within a knowledge or innovation systems framing.

6.1.4 The final discussion session at the Nairobi workshop will seek to bring together the outcomes from the three working sessions to provide material for a working paper.

Annex 1.   References

African Union Commission (2014). Science, Technology and Innovation Strategy for Africa 2014. African Union Commission.Addis Ababa 51 pg. https://www.au.int/web/sites/default/files/documents/29957-doc-stisa-published_book.pdf

Blicharska, M., Smithers, R.J., Kuchler, M., Agrawal, G.K., Gutierrez, J.M., Hassanali, A., Huq, S., Koller, S.H., Marjit, S., Mshinda, H.M., Masjuki, H.H., Solomons, N.W., Staden, J.V. and Mikusinski, G. (2017). Steps to overcome the North-South divide in research relevant to climate change policy and practice. *Nature Climate Change* **7**(1): 21-27. DOI: 10.1038/nclimate3163

Costley, J. (2016). NYAS Summit on Science and Technology Enablement for the Sustainable Development Goals. Meeting report. New York Academy of Sciences.New York 26 pg. http://www.nyas.org/SDGSummit2016-FinalReport

DFID (2008). Research strategy. 2008-2013. 45 pg. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67757/research-strategy-08.pdf

ESPA (2014). ESPA Logical Framework 2014. Ecosystem Services for Poverty Alleviation Programme.Edinburgh pg. http://www.espa.ac.uk/files/espa/ESPA-Logframe-2014-v4.pdf

ESPA (2016). Impact Strategy: 2016-2017. 7 pg. http://www.espa.ac.uk/files/espa/ESPA%20Impact%20Strategy%20Mar%202016%20v12_%20FINAL_2.pdf

Future Earth (2014). Strategic research agenda 2014. Priorities for a global sustainability research strategy. Future Earth 27 pg. http://www.futureearth.org/sites/default/files/strategic_research_agenda_2014.pdf

HM Treasury and DFID (2015). UK aid: tackling global challenges in the national interst. 22 pg. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/478834/ODA_strategy_final_web_0905.pdf

King's College London and Digital Science (2015). The nature, scale and beneficiaries of research impact: An initial analysis of the 2014 Research Excellence Framwork (REF) impact case studies. 89 pg. http://www.kcl.ac.uk/sspp/policy-institute/publications/Analysis-of-REF-impact.pdf

Meagher, L.R. and Lyall, C. (2013). Learning review for Ecosystem Services for Poverty Alleviation (ESPA). pg. http://www.espa.ac.uk/files/espa/ESPA-Learning-Review-Final-Report-Nov2013.pdf

Millennium Ecosystem Assessment (2005). Ecosystems and human well-being: Synthesis. Washington DC, Island Press.

Scientific Advisory Board of the UNSG (2016). Science for Sustainable Development. 8 pg. http://unesdoc.unesco.org/images/0024/002461/246105E.pdf

Stöckli, B., Wiesmann, U. and Lys, J.-A. (2014). A Guide for Transboundary Research Partnerships: 11 Principles, 7 Questions, 2nd edition. 14 pg. http://www.naturalsciences.ch/uuid/564b67b9-c39d-5184-9a94-e0b129244761?r=20161005181841_1475030362_3898d31d-7a25-55d7-8208-d9cbeada1d05

UN (1972). Report of the United Nations Conference on the Human Environment. 77 pg. http://www.un-documents.net/aconf48-14r1.pdf

UN (2000). United Nations Millennium Declaration. Resolution adopted by the General Assembly A/Res/55/2. 9.New York 9 pg. http://www.un.org/millennium/declaration/ares552e.pdf

UN (2001). Road map towards the implementation of the United Nations Millennium Declaration. Report of the Secretary General. A/56/326.New York 1-58 pg. http://www.un.org/documents/ga/docs/56/a56326.pdf

UN (2015a). Addis Ababa action agenda of the Third International Conference on Financing for Development (Addis Ababa Action Agenda). 61 pg. http://www.un.org/esa/ffd/wp-content/uploads/2015/08/AAAA_Outcome.pdf

UN (2015b). Science, technology and innovation: Critical means of implementation for the SDGs. Scientific Advisory Board of the Secretary-General of the United Nations 2 pg. http://en.unesco.org/un-sab/sites/un-sab/files/Final_SAB_PB_MOI.pdf

UN (2015c). Transforming our world: The 2030 Agenda for Sustainable Development. 41 pg. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

UNCED (1987). Our Common Future. Oxford, Oxford University Press.

UNCED (1992). UN Conference on Environment and Development. Agenda 21. United Nations Conference on Environment and Development.New York 351 pg. https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

UNCSD (2012). The future we want. Oucome document of the United Nations Conference on Sustainable Development. Unted Nations 72 pg. https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf

UNESCO (2016). UNESCO Science report. Towards 2030. UNESCO.Paris 820 pg. http://unesdoc.unesco.org/images/0023/002354/235406e.pdf

UNFCCC (2015). Paris agreement. 25 pg. http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

UNISDR (2015). Sendai framework for disaster risk reduction 2015-2030. United Nations 36 pg. http://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf

Vogel, I. (2012). Review of the use of 'Theory of Change' in international development. Department for International Development 82 pg. https://assets.publishing.service.gov.uk/media/57a08a5ded915d3cfd00071a/DFID_ToC_Review_VogelV7.pdf

Vogel, I. (2013). ESPA guide to working with Theory of Change for research projects. Ecosystem Services for Poverty Alleviation Programme 38 pg. http://www.espa.ac.uk/files/espa/ESPA-Theory-of-Change-Manual-FINAL.pdf

Wilton Park (2016). Knowledge for development: optimising development impact through investments in research (WP1514). 3 pg. https://www.wiltonpark.org.uk/wp-content/uploads/WP1514-Report.pdf

Annex 2. OECD Definition of eligibility for Official Development Assistance

The DAC defines ODA as "those flows to countries and territories on the DAC List of ODA Recipients and to multilateral institutions which are:

i. *provided* by official agencies*, including state and local governments, or by their executive agencies; and*

ii. *each transaction of which:*

a) *is administered with the promotion of the economic development and welfare of developing countries as its main objective; and*

b) *is concessional in character and conveys a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent)."*

For a detailed explanation of this definition, see Is it ODA?