AFRICA-EU RESEARCH COLLABORATION ON HEALTH

A Critical Analysis of the Scope, Outputs and Potential Outcomes

CAAST-Net PLUS

Building Bi-regional Partnerships for Global Challenges

CAAST-Net Plus (2013-2016)

Advancing Sub-Saharan Africa-EU Research and Innovation Cooperation for Global Challenges

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ACP	African, Caribbean and Pacific Group of States
ACPS&T	ACP Science and Technology Programme
AIDS	Acquired Immuno-Deficiency Syndrome
AMANET	African Malaria Network Trust
ANDI	African Network for Drugs and Diagnostics Innovation
ARGP	African Union Research Grants Programme
ASTII	African Science, Technology and Innovation Indicators
AU	African Union
AUC	African Union Commission
BVGH	BIO Ventures for Global Health
CAAST-Net	Network for the Coordination and Advancement of Sub-Saharan Africa-EU Science and Technology Cooperation
CAAST-Net Plus	Advancing Sub-Saharan Africa-EU Cooperation in Research and Innovation for Global Challenges
CARMMA	Campaign for Accelerated Reduction of Maternal Mortality in Africa
CISM	Manhiça Health Research Centre in Mozambique
COHRED	Council on Health Research for Development
CORDIS	Community Research and Development Information Service
CRESIB	Barcelona Centre for International Health Research
DFID	Department for International Development
DNDi	Drugs for Neglected Diseases Initiative
EDCTP	European and Developing Countries Clinical Trials Partnership
EDF	European Development Fund
EFPIA	European Federation of Pharmaceutical Industries and Associations
EMG	European Malaria Graduate School
EU	European Union
EUCO-Net	European Network for Global Cooperation in the Field of AIDS & TB
FCSAI	Spanish Foundation for International Cooperation, Health and Social Policy
FDA	Food and Drug Administration
FEMHEALTH	Fee Exemption for Maternal Health Care
FP6	Sixth Framework Programme
FP7	Seventh Framework Programme
GACD64	Global Alliance for Chronic Diseases
GATB	Global Alliance for Tuberculosis Drug Development
GAVI	Global Alliance for Vaccines and Immunization
GFTAM	Global Fund to Fight AIDS, Tuberculosis & Malaria
GlopiD-R	Global Research Collaboration for Infectious Disease Preparedness
GSPA	Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
HLPD	High Level Policy Dialogue
HPV	Human Papillomavirus
ICGEB	International Centre for Genetic Engineering and Biotechnology
ICH	International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use
IMI	Innovative Medicines Initiative

IP	Intellectual Property
IPR	Intellectual Property Rights
JAES	Joint Africa-EU Strategy
MDGs	Millennium Development Goals
MoEST	Ministry of Education, Science and Technology, Kenya
NCDs	Non-communicable Diseases
NEPAD	New Partnership for Africa's Development
PACTR	Pan-African Clinical Trials Registry
PRDs	Poverty-related Diseases
R&D	Research and Development
R&I	Research and Innovation
RECs	Regional Economic Communities
REMoXTB	Rapid Evaluation of Moxifloxacin in the Treatment of Sputum Smear Positive Tuberculosis
RFI	COHRED Research Fairness Initiative
Rio+20	United Nations Conference on Sustainable Development - Rio de Janeiro, Brazil (June 2012)
RIs	Research Infrastructures
SMEs	Small and Medium-sized Enterprises
SSA	Sub-Saharan Africa
STI	Science, Technology and Innovation
TB	Tuberculosis
TFEU	Treaty on the Functioning of the European Union
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
US	United States of America
WHA	World Health Assembly
WHO	World Health Organization
WHO/TDR	World Health Organization Special Programme for Research and Training on Tropical Diseases

PREFACE

In 2007, heads of state and government from Africa and Europe took the existing Africa-EU partnership to a new level, launching the Joint Africa-EU Strategy (JAES). An overtly political relationship, formulated in response to geopolitical changes, globalisation and the processes of integration in Africa and Europe, the Strategy's core objectives include a new partnership to address our common global challenges. Among the features distinguishing JAES from previous Africa-Europe policy initiatives is a rolling action plan addressing joint priorities for Africa-Europe cooperation. Jointly achieving global health goals and providing affordable, sustainable and quality healthcare to all is a common challenge at the heart of this new partnership. The contribution to the Africa-EU partnership of scientific and technological research and development and innovation (STI) is explicit, as is the centrality of research capacity for economic and social growth and poverty alleviation, for building knowledge-based societies, and for addressing global societal challenges of mutual interest. Cooperation in STI between the continents is central and has already led to significant achievements for mutual benefit. In 2014, African and European heads of state met in Brussels for the 4th EU-Africa Summit under the theme of "Investing in People, Prosperity and Peace", recommitting to the core objective of JAES and to enhancing Africa-EU cooperation for the period 2014-2017.

CAAST-Net Plus serves the Africa-Europe partnership in STI, as framed by the JAES. We encourage more and better bi-regional STI cooperation for enhanced outcomes around topics of mutual interest, particularly in relation to the global societal challenges of climate change, food insecurity and health for all. In supporting the partnership CAAST-Net Plus draws heavily on debate and discussion among communities of STI stakeholders for gathering informed opinion and experience about Africa-Europe cooperation processes. The knowledge we gather and the analyses we conduct combine to inform and enrich policy and decision making around cooperation in formal and informal situations. This report forms part of a series of three CAAST-Net Plus reports that focus on research cooperation between European and African actors in the three global societal challenges highlighted above.

Through informing the bi-regional policy dialogue for mutual learning and awareness, through building support for coordinated and innovative approaches to funding bi-regional cooperation around global challenges, through brokering the public-private relationship to foster improved uptake and translation of bi-regional research partnership outputs into innovative technologies, good and services, and through dedicated mechanisms to encourage bi-regional research partnerships, CAAST-Net Plus is adding value to the quality and scope of the Africa-Europe STI relationship for mutual benefit.

Dr Andrew Cherry
CAAST-Net Plus Project Coordinator

Dr Eric Mwangi
CAAST-Net Plus Africa Region Coordinator

EXECUTIVE SUMMARY

Africa-EU health research and innovation cooperation ('health R&I cooperation') is increasingly characterised by an expanding number of projects and initiatives, growing numbers of both African and European researchers engaged in joint activities, and greater participation by the private sector. In the last decade alone the European Union's financial contribution to health research in Africa has more than doubled. Within this pool of investment lie relatively large initiatives, such as projects funded by the EU's framework programmes and the European and Developing Countries Clinical Trials Partnership (EDCTP). In addition, there are many past and present bilateral health research initiatives between EU member states and African countries.

This study maps the landscape of health R&I cooperation, placing emphasis on initiatives financed through FP6, FP7 and the ACP Science and Technology Programme (ACPS&T), while also offering a glance at bilateral cooperation initiatives. The overall aim of the study is to analyse the extent to which health R&I cooperation supported by the framework programmes, by other major bi-regional programmes, and to a lesser extent by bilateral programmes, is addressing agreed joint health R&I priorities, is fostering the uptake and translation of research results by the private sector, and is being used to inform policymakers.

The research establishes that cooperation has indeed generated tangible outputs and potential outcomes, such as new scientific knowledge, increasing numbers of graduates, new products and processes, findings that have influenced public policies, and new forms of social capital between researchers from the two regions. Health R&I cooperation initiatives that have delivered significant results are generally those that received relatively large-scale financing over a long period of time. Though there are various policy and institutional challenges, there has been an increase in private sector participation in health R&I cooperation, particularly in the area of drug and vaccine development.

However, our research also finds that while cooperative initiatives responded to, or were aligned with, commonly expressed health priorities, funding for these efforts was derived predominantly from EU instruments with minimal, if any, African financial contribution. This is despite the existence of many African policy declarations on the importance of health R&I, and national statements of intent to increase investments in R&I. According to many of the interviewees consulted in this research, this weakened African participation in bi-regional cooperation.

Another key research finding is that even though joint health R&I initiatives have been broadly aligned to shared health priorities, this was not necessarily because of deliberate joint *health R&I* priority setting. Action plans for the implementation of the JAES, for example, did not contain or outline specific joint health R&I priorities, mainly because there were no priority setting processes and because health R&I has not been high on the agenda Africa-EU leadership summits.

The overall assessment of the study is that Africa-EU health R&I cooperation needs a much clearer framework setting out shared priorities and funding mechanisms. Both Africa and Europe also need to introduce policy measures that create incentives for private sector participation in R&I, including and especially when it comes to the uptake of scientific research findings.

KEY FINDINGS AND RECOMMENDATIONS

Finding #1: Joint health R&I innovation priorities are not outlined in action plans. Because of this, neither EU nor AU research strategies have implementation mechanisms to action jointly determined priorities.	**Recommendation #1:** African and EU policymakers should integrate health R&I priorities in the JAES Roadmap 2014-2017. Given the need to review the Africa Health Strategy 2007-2015, in the post-2015 MDGs context, the AU should establish a regional process for health R&I priority setting. *CAAST-Net Plus could promote policy dialogue on bi-regional health R&I priority setting and stimulate the EU-Africa High Level Policy Dialogue (HLPD) on Science, Technology and Innovation to integrate specific R&I priorities in the JAES Roadmap 2014-2017. CAAST-Net Plus partners such as COHRED can contribute to this process by sharing guidelines for setting R&I priorities.
Finding #2: The absence of African financing mechanisms and action plans for policy implementation is a barrier to enhanced African participation in bi-regional health R&I.	**Recommendation #2:** The AU and its international partners should establish an African fund for regional and bi-regional health R&I. *CAAST-Net Plus could work with the African Union Commission to prepare a policy paper on potential African mechanisms for financing regional and bi- regional health R&I. The paper could be used to stimulate dialogue within the HLPD and AU leadership.
Finding #3: There is irregular and unreliable information on African R&I-performing SMEs and no evidence of the participation of such SMEs in Africa-EU health cooperation.	**Recommendation #3:** Conduct a comprehensive survey to identify R&I-performing SMEs in Africa and develop an online database with profiles of these SMEs.

Finding #4: A range of policy deficits associated with weak intellectual property protection, limited R&D incentives, regulatory barriers to clinical trials, and limited research-industry linkages are barriers to private sector participation in Africa-EU health R&I cooperation.	**Recommendation #4:** AU member states should be encouraged to review their national R&I policies to reduce barriers to private sector participation. This is also a matter for the Regional Economic Communities to address at regional level. *CAAST-Net Plus could support further analysis on factors that influence the participation of the private sector in health R&I in Africa. Analysis could include a survey of research-performing SMEs, cases studies on the impact of IPR on private sector, R&D incentives, and socio-economic issues related to clinical trials.
Finding #5: Research-to-policy interfaces are relatively weak in Africa-EU health cooperation.	**Recommendation #5:** Encourage European and African policymakers to establish a permanent, joint research and innovation commission to promote more intensive future research and innovation collaborations. *CAAST-Net Plus could document and disseminate information on best practices regarding how scientific research enterprises influence public policy.

1

INTRODUCTION

Bi-regional cooperation between Africa and Europe has grown in scope and intensity in recent decades. The adoption of the Cotonou Partnership Agreement in 2000, the first Africa-EU Summit in Cairo in 2000, and the adoption of the JAES in 2007 with its emphasis on bi-regional cooperation in science, technology and innovation (STI) have all shaped cooperation between the two regions. There is now more emphasis on building Africa-EU trade, development and research partnerships that are based on mutual interests addressing joint priorities.

Bi-regional *health R&I* cooperation is presently realised using a variety of financing mechanisms, policy frameworks and institutional arrangements. There are for example many bilateral cooperation initiatives on health R&I financed by individual EU member states. Multi-country bi-regional health R&I cooperation has largely been funded through EU programmes, such as the Sixth Framework Programme (FP6) for Research and Technological Development (2002-2006), the Seventh Framework Programme (FP7) for Research and Technological Development (2007-2013) and, most recently, the Horizon 2020 Framework Programme for Research and Innovation (2014-2020). To strengthen cooperation with Africa, the EU has also used development cooperation instruments such as the African, Caribbean and Pacific Science and Technology Programme (ACPS&T) to support joint health R&I initiatives.

Africa and Europe also cooperate within the context of global initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria ('the Global Fund'), the Global Alliance for Vaccines and Immunization (GAVI), the Global Alliance for Chronic Diseases (GACD64), the World Health Organization Special Programme for Research and Training in Tropical Diseases (WHO/TDR), the International AIDS Vaccine Initiative (IAVI), and the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R). Some of these global health initiatives are organised as public-private partnerships that address a range of objectives such as mobilising funding for global research on specific diseases, conducting scientific research, and developing health innovations. Private sector actors, both for-profit and non-profit organisations, also play an important role in these initiatives, encompassing, broadly, funding and knowledge uptake and translation activities.

Cooperation between Africa and the EU is guided by a number of policy instruments that articulate common aspirations and outline joint priorities. The most explicit and active common policy instrument is the JAES, which was adopted by African and European leaders in Portugal in 2007. The JAES outlines common health priorities as part of the overall objectives of the Africa-EU strategic partnership. Another important policy instrument is the AU's Africa Health Strategy 2007-2015, which also outlines priorities for international cooperation in health.

1.1 Study goals and research questions

In the presence of all of this cooperation, however, there is a paucity of information about specific outputs and outcomes. This undermines the prospects of designing and implementing policies to improve the quality of the cooperation and to increase its impact. Our working hypothesis in developing this report is that a critical analysis of outputs and outcomes of previous and current cooperation in health R&I would assist both African and European researchers, private sector actors and policymakers to more accurately target future investments. We also believe the analysis could serve to inform European, African and other funders to address any existing gaps or unmet needs in health R&I. As such, this report is a critical analysis of the policy instruments, priorities, funding mechanisms and potential outcomes of health R&I cooperation between Africa and Europe. It addresses the following questions:

- What is the political and policy context for bi-regional cooperation in health R&I, and to what extent are there joint health R&I priorities?
- To what extent is Africa-EU cooperation in health R&I financed by the framework programmes (FP6, FP7), on the one hand, and the ACPS&T programme, on the other hand? Are there other financing mechanisms that are being used to support bi-regional health R&I cooperation?
- What are some of the key outputs and indicative outcomes of health R&I cooperation funded through successive framework programmes, including the European and Developing Countries Clinical Trials Partnership (EDCTP)?
- What are the challenges relating to the private sector's participation in health R&I cooperation?
- What are the key actions that should be taken by policymakers to strengthen Africa-EU health R&I cooperation?

1.2 Structure of the report

This report is organised into six sub-sections: The first sub-section consists of a concise overview of why international health R&I cooperation matters to the global sustainable development agenda. This is followed by a brief discussion of the policy frameworks and financing mechanisms that the two regions have adopted to strengthen their relationships in STI in general and health R&I in particular. In a third sub-section our conceptual framework for assessing outputs and outcomes of Africa-EU health R&I initiatives is outlined, alongside a brief statement on methodology. In sub-section four the Africa-EU health R&I project and programme landscape is mapped, showing the

diversity of cooperation initiatives and outlining issues pertaining to both the funding instruments and general conditions of cooperation. Outputs and potential outcomes of the EDCTP programme are described in sub-section five. A critical analysis of pertinent issues for health R&I cooperation is developed in sub-section six.

1.2 Who should read this report

The authors of this study hope that this report is genuinely used to improve Africa-EU bi-regional cooperation in health R&I. It is therefore targeted at a range of health R&I stakeholders, particularly the AU, EU and national governments, and as well as scientists, research managers and policymakers, for example, within the EU-Africa HLPD on STI. Any comments about the contents of this report can be directed to the research team (enquiries@caast-net-plus.org).

2

THE CASE FOR INTERNATIONAL HEALTH R&I COOPERATION

Cooperation in health R&I is critical to reducing the burden of disease in developing countries and the attainment of global public health. These imperatives are recognised by the international community and national governments around the world, and are manifested in many declarations of the United Nations, regional bodies such as the African Union (AU) and the European Union (EU), as well as in national policies and strategies. For example, The Future We Want (the UN Rio+20 outcome document), the UN's Agenda 21, and the AU's Africa Health Strategy 2007-2015 all contain specific provisions aimed at promoting international cooperation in R&I in order to secure global public health.[1]

In 2008 the EU adopted its Strategic European Framework for International Science and Technology Cooperation. The Framework is premised on the following set of ideas:

> Globalisation is accelerating, and this has an impact on the way we produce, share and use knowledge. *Major global challenges such as climate change, poverty, infectious disease, threats to energy, food and water supply, security of the citizen, networks security and the digital divide highlight the need for effective global S&T cooperation to promote sustainable development.* The importance of cooperation is also articulated in most national health research policies and strategies. (European Commission, 2008, p. 4; author emphasis)

The Framework identifies bi-regional science and technology cooperation as being critical to efforts to address global challenges and notes that, in the case of Africa, EU-supported S&T cooperation would focus on activities or actions aimed at achieving the MDGs, including combating disease.

2.1 Four reasons *for* international health R&I cooperation

There are at least four reasons why international cooperation in health R&I is critical to attaining global public health. First, many of the health challenges are global in nature. Diseases such as HIV/AIDS, diabetes and cancer afflict human populations around the world. Others, such as Ebola, spread rapidly across continental borders and can pose health and security threats even in developed countries. It is thus in the interest of countries — both developed and developing — to cooperate in conducting research on, and developing solutions to, common or shared health challenges.

Second, international cooperation in R&I enables countries to exploit economies of scale by sharing the costs of producing new knowledge and developing new health products such as vaccines (Wagner, 2008). Health research infrastructures (RIs) including instrumentation or equipment is relatively expensive and not always available or accessible to many researchers, particularly in poor or least developed countries (LDCs). Through international R&I cooperation researchers from

[1] Paragraph 89 of the Africa Health Strategy, for example, focuses on cooperation in research and emphasizes the need for countries to share their research findings.

different countries and regions are able to access and share RIs necessary for the realisation of research addressing common priorities.

Third, international research cooperation is expected to increase scientific productivity "through sustaining the process of knowledge creation and as a means to increase the division of tasks" (Defazio, et al., 2009, p. 293). According to Lee and Bozeman (2005) there is a strong relationship between cooperation and productivity. They argue:

> Research in many fields is more complex and requires more specialised knowledge, more than any single individual can expect to have. Collaboration permits individuals to play to their strong suits, contributing their strongest skills and deepest knowledge, relying on others to contribute other skills and knowledge. (Lee & Bozeman, 2005, p. 677)

Cooperation in research enables countries to mobilise and use their differentiated research capabilities. Scientific productivity is likely to increase through the mobilisation and use of specialised knowledge and multidisciplinary expertise that no single country has in abundance.

Fourth, international research cooperation enables countries to access the existing global pool of scientific knowledge. It can also be utilised to build capacities to contribute to the generation of new knowledge by enabling researchers to participate in international research networks. Indeed, the participation of countries in international networks can enable access to knowledge that is produced outside national borders and laboratories that might not otherwise be easily accessible. As Wagner (2008) suggests:

> Outbreaks of Ebola and Marburg viruses, for example, have been reported in Africa in Sudan, Zaire, Gabon and the two Congos: Republic of the Congo and Democratic Republic of the Congo. Research on such viruses conducted in Marburg, Germany, would most likely be applied to and aid people thousands of miles away. (p. 107)

2.2 An increase in health R&I outputs and financing

There is a growing body of empirical evidence that shows international health R&I cooperation to be increasing. A study by Smith and Katz (2000) shows the number of internationally co-authored articles in health sciences increased by almost twofold between 1981 and 1995 (Smith & Katz, 2000). Africa's participation in international health research programmes has also increased. A recent report of the World Bank and Elsevier (2014) concludes that Sub-Saharan Africa's share of global health research increased from 0.44% to 0.72% during the decade 2003-2012. This is largely due to international cooperation, the report suggests.

> A very large share of SSA research is a result of international collaboration. In 2012, 79%, 70% and 45% of all research by Southern Africa, East Africa, and West and Central Africa, respectively, were produced through international collaborations. (World Bank & Elsevier, 2014, p. 4)

According to the report health research accounted for a large portion of the increase in the region's share of global research output:

> SSA's output growth has overwhelmingly been driven by advances in Health Sciences research (approximately 4 percent annual growth) which now accounts for 45% of all SSA research. (*ibid*, p. 3)

2.3 Developments in health R&I financing in sub-Saharan Africa

The increase in international cooperation in health research and the growth in SSA's health research outputs are likely to be associated with increased funding for health in the region. A recent study for EDCTP shows that there has been a significant increase in funding for research on HIV/AIDS, malaria and tuberculosis in SSA (Cardoso, et al., 2014). These three diseases attracted more than 80% of the total global R&D investments in the region between 2007 and 2011. During the same period the EU, through the European Commission (and excluding member state contributions), was the fourth largest funder of health R&D in the region after the US National Institutes of Health, the Bill and Melinda Gates Foundation, and pharmaceutical and biotechnology companies (ibid).

The private sector's participation in cooperation involving African countries has also increased in the past decade. In addition to the investments of the non-profit private sector philanthropic institutions, such as the Wellcome Trust (UK) and the Bill and Melinda Gates Foundation, for-profit companies such as Astrazeneca (UK), GlaxoSmithKline (UK), Novartis (Switzerland), Sanofi (Switzerland), Merck (USA), and Pfizer (USA) are involved in multilateral and bilateral cooperation health R&I initiatives in Africa.[2] These and other such actors are engaged in a variety of ways, including through the funding of R&I activities, or as sources of knowledge assets such as patents for drug and vaccine development. Researchers from GlaxoSmithKline, for example, are working with African scientists in various projects to develop a vaccine against malaria and a vaccine candidate (RTS,S) is being developed in partnership with PATH MVI, supported by grants from the Bill and Melinda Gates Foundation.

[2] For examples of companies involved in health R&I partnerships in Africa see BVGH (2014).

2.4 Lessons learned

International cooperation between African and European scientists, doctors and policymakers is a necessity for combatting the threat of infectious diseases. The Ebola epidemic has taught us many invaluable lessons, including the importance of building laboratories of excellence as well as maintaining strong intercontinental networks to accelerate control over public health issues. These cooperation networks should not only be restricted to the essential aspects of patient care, but also extend to novel technologies, diagnosis, surveillance and control. An active policy of partnership for innovative public health initiatives between Africa and Europe will be an encouraging step in making improved and enhanced health systems a priority on both continents.

3

POLICY FRAMEWORKS AND FINANCING MECHANISMS

Africa's trade, political and development cooperation with Europe in general and the EU in particular has a long and complex history. It has evolved and intensified in recent decades as a result of various geopolitical factors, including regional integration in the two continents as well as Africa's increasing importance within the international arena (Mujivane, 2011). Key frameworks and events that have helped shape and strengthen the cooperation include the:

- Lomé Convention (1975) and subsequent Cotonou Agreement (ACP-EU Partnership Agreement) (2000);
- European Community's Development Policy (2000);
- Africa-EU Summit in Cairo (2000),
- Constitutive Act of the African Union (2000); and,
- Joint Africa-EU Strategy (adopted in 2007).

The JAES is the main political and policy framework that presently guides cooperation between the two regions at the multilateral level (African Union-European Union, 2007a). It was adopted by the 52 member states of the AU and the 27 member states of the EU at the second Africa-EU Summit in 2007 in Lisbon, Portugal. A key objective of the JAES has been to ensure that the MDGs are addressed, including eradicating HIV/ AIDS and improving child and maternal health.

3.1 Cooperation goals within the provisions of the JAES

The areas for Africa-EU cooperation in health in general and health R&I in particular is explicitly mentioned in paragraphs 8(iii), 44, 49, 60, 61 and 62 of the JAES (Appendix A), while paragraphs 84 and 87 emphasize STI cooperation. In paragraph 84, for example, the two regions explicitly recognise that to attain sustainable development they need to cooperate and jointly invest in STI.

> Africa and the EU will strengthen their cooperation in building knowledge-based societies and economies. Both sides recognise that the development of S&T and innovation is one of the essential engines of socio-economic growth and sustainable development in Africa; that competitiveness in the global economy is increasingly dependent on knowledge and innovative ways of applying modern technology, especially Information and Communication Technology (ICT); and that meeting the MDGs requires a special global effort to build scientific and technological capacities in Africa. Thus partnerships and investments advancing access to ICT infrastructure, access to quality education, and the development of science and technology and innovation systems in Africa are crucial for attaining all other development goals.

The common health goals outlined in the JAES are expected to have been attained through initiatives spelled out in the action plans for JAES implementation, including the first action plan, which covered the period 2008-2010 (African Union-European Union, 2007b), and the second action plan covering the period 2011-2013 (African Union-European Union, 2010). The present JAES roadmap for the period 2014-2017 was adopted at the EU-Africa Summit held in April 2014.

Yet the JAES does not contain or outline specific R&I health priorities. The first JAES action plan (2008-2010), for example, only makes a general reference to two health R&I related issues: enhancing AU-EU cooperation in support of the implementation of the African Pharmaceutical Manufacturing Plan; and cooperation to support Africa in making progress towards the Abuja commitments related to African countries allocating at least 15% of their national budgets to the health sector. The second action plan (2011-2013) focuses almost exclusively on the Campaign for Accelerated Reduction of Maternal Mortality in Africa (CARMMA). Though a very important initiative to achieve MDGs 4 and 5, CARMMA has no explicit STI objectives. The current action plan (2014-2017) only makes general reference to cooperation as a route to improving sanitation and health care, including sexual and reproductive health, as well as cooperation in STI to address infectious diseases.

Moreover, even though setting joint priorities for STI has been recognised by both AU and EU leadership as essential for ensuring that investments in R&I generate the desired impacts, achieving health R&I priorities has proven elusive so far. The EU-Africa HLPD on STI has had at least two meetings since 2010 to consider specific joint STI priorities and to provide overall political guidance for the implementation of the JAES. So far, however, the HLPD has not identified specific joint R&I priorities to address the health challenges outlined in the JAES, placing its focus for the time being instead on food and nutrition security and sustainable agriculture.

3.2 EU policy instruments and financing mechanisms

The EU has a range of policy instruments and financing mechanisms for health R&I cooperation with Africa.[3] Individual member states of the EU also have national policies and funding mechanisms for bilateral research cooperation with African countries or regional bodies. This sub-section of the study describes the EU instruments and mechanisms for research cooperation with Africa, including FP6, FP7, Horizon 2020 and the European Development Fund (EDF).

[3] See European Commission (2013) and European Commission (2009).

The EU framework programmes are perhaps the most significant policy and financing mechanisms the EU has used in recent decades to support R&I cooperation with Africa. FP6 covered the period 2002 to 2006 with a total budget of EUR 17.5 billion dedicated to research, technological development and demonstration (RTD) across a range of fields involving intra-European and international cooperation. FP6 projects in support of international RTD cooperation with African countries amounted to 131 projects involving teams from 33 African countries through which African teams received more than EUR 94 million (European Commission, 2009). FP6 health R&I projects were grouped and funded under the environment and health thematic priority areas, with most of them containing an emphasis on life sciences, biotechnology, innovative medicines and poverty-related diseases. Specific FP6-funded health projects focused on epidemiological studies of infectious diseases, developing HIV microbicides, genomics and its applications to health, genotoxic studies, development of diagnostic tools for infectious diseases, therapeutics, and bio-banking (European Commission, 2009). The EC's budget allocation for the health priority in general (including non-R&I activities) was approximately EUR 2.5 billion, though only a small fraction was allocated to cooperation with Africa.

FP7 covered the period 2007 to 2013 with a total budget of EUR 53.2 billion. About EUR 6.1 billion allocated for both intra-European and international cooperation was dedicated to health. In comparison to FP6, the amount of EC contribution received by African, Caribbean and Pacific (ACP) states in FP7 amounted to EUR 107,62 million. Under FP7 the focus of research themes broadened to include more projects on health research policy and health systems strengthening. A special FP7 Coordinated Call for Africa (the 'Africa Call') focusing on water, food security and health was issued in 2009 with a budget of EUR 65 million (European Commission, 2013a). This funding opportunity increased the number of African countries participating in FP7-funded projects in Africa (CAAST-Net, 2012). FP7 placed emphasis on epidemiological studies of infectious diseases, translational research on neglected infectious diseases, development of vaccines and drugs for neglected infectious diseases (particularly bacterial, helminths and protozoal infections), development of diagnostic tools, and immunological studies.

The current framework programme for supporting cooperation is Horizon 2020, which was launched in 2014. Horizon 2020 will support R&I focusing on chronic and infectious diseases, antimicrobial resistance, and developing better diagnostics and more effective therapies. The Horizon 2020 programme also enables the EU to invest in research that aims to support African countries to respond to emerging epidemics such as Ebola. For example, in October 2014 the EU allocated approximately EUR 24.4 million to support five collaborative projects on Ebola through a fast-track granting mechanism (European Commission, 2014a).

Within the context of framework programme-supported projects, efforts to support Africa and the EU to develop a common agenda on non-communicable diseases have been described by McCarthy, et al. (2010) and Olesen & Parker (2012). The CAAST-Net project, an FP7 coordination and support action, led to the adoption of at least one joint Africa-EU R&I initiative focusing on non-communicable diseases (McCarthy, et al., 2010). Within the framework of the EDCTP, multi-country R&I priority setting is mainly focused on clinical research and vaccine development. Over the past decade EDCTP priority setting has formed the basis for significant investments in malaria, HIV and tuberculosis research.

Another key mechanism for supporting Africa-EU health R&I cooperation is the EDF. The EDF has been used to fund intra-ACP cooperation and EU-ACP cooperation within the framework of the ACP-EU Cotonou Partnership Agreement. The ninth EDF for intra-ACP cooperation, spanning the period 2000-2007, had an allocation of approximately EUR 97 million directed to initiatives such as the Global Alliance for Vaccines and Immunization (GAVI), the EC/ACP/ENFPA/IPPF Reproductive Health Commodity Security project, the EC/ACP/WHO strategic partnership on pharmaceutical policies, a strategic partnership with the WHO to support eight ACP countries with health policies and information systems, and the African Malaria Network Trust (AMANET) to support development of malaria vaccines and multi-centre trials in sub-Saharan Africa. The tenth EDF covering the period 2008-2013 had an increased total budget of EUR 22.7 billion, of which EUR 22 billion was allocated to the ACP countries. A significant portion of the ACP allocation was directed to the Global Fund, which was allocated EUR 270 million. A large portion of this was directed to African networks working on vaccine development. The eleventh EDF covers the period 2014-2020 and has a budget of EUR 30.5 million.

In addition to the EU-wide instruments and mechanisms, there are many EU member state national initiatives that support bilateral cooperation in health R&I (see also sub-section heading 5.1). These include, for example, the Partnerships for Sustainable Solutions with Africa designed by the German Federal Ministry of Education and Research; the Joint German-French financial mechanism for research cooperation with Sub-Saharan African countries; the UK Department for International Development (DFID) African Capacity Building Initiative; as well as many others.

On the whole, the EU and its member states have developed and used a range of policy instruments and financial mechanisms to support cooperation with Africa in health R&I. Funding for health R&I cooperation has increased over the past two decades, and there has also been an increase in the number of collaborative research initiatives involving both African and European partners.

3.3 African policy instruments and financing mechanisms

The importance of international cooperation in health R&I is recognised by African leaders, and is articulated in many political and policy declarations of the AU, including and especially in its Africa Health Strategy (African Union, 2007). Many AU summit declarations contain policy statements on increasing investments in health in general and in particular health R&I. These declarations include:

- Abuja Declaration and Plan of Action on Roll Back Malaria (RBM) of 2000;
- Abuja Declaration and Plan of Action on HIV and AIDS, Tuberculosis and Other Infectious Diseases (ORID) of 2001;
- 2006 Abuja Call for Accelerated Action Towards Universal Access to HIV and AIDS, Tuberculosis and Malaria Services by 2010;
- Maputo Declaration on Malaria, HIV/AIDS, Tuberculosis and Other Related Infectious Diseases (ORID) of 2003;
- 2008 Algiers Declaration of the Ministerial Conference on Research for Health in the African Region; and,
- 2008 Bamako Communique of the Global Ministerial Forum on Research for Health.

Notably, the Algiers Declaration has many provisions on health R&D and places special emphasis on measures for supporting research for innovation (World Health Organization, 2008). The declaration for example explicitly recognises the "need for adequate and incentive investments in research and development to produce new and effective medicines, diagnostic tools, vector control tools and vaccines". It also says that governments should:

> allocate at least 2% of national health expenditure and at least 5% of external aid for health projects and programmes to research and research capacity building and invest more in research aimed at improving health systems […] [and] continue to promote innovative research in basic sciences and its transformation into new tools such as medicines, vaccines and diagnostics tools. (World Health Organization, 2008)

In addition, the Bamako communique emphasizes measures governments must institute in order to strengthen research for health. These include:

- ensuring that research considerations are integrated into national strategies and budgets;
- earmarking at least 2% of national health budgets for research;
- promoting research for product development; and,
- designing and ensuring implementation of research policies. (Global Ministerial Forum on Research for Health, 2008)

Overall, the Africa Health Strategy has been the main policy instrument promoting the continent's cooperation in health with the international community, including the EU, and was designed to

promote the implementation of various political and policy statements contained in the declarations outlined above. The Strategy has also been used by African leaders in engaging their European counterparts in dialogues on how best to realise the health goals of the JAES. One of the key policy statements articulated by the Strategy concerns the funding of health research in Africa.

> Countries should allocate at least 2% of national health expenditure and 5% of project and programme aid for research. They should determine what their essential national health research needs are and establish platforms for such research to flourish. (African Union, 2007, p. 8)

Other related policy statements on health R&I are outlined in paragraphs 87-89 of the Strategy (see Appendix B). The Strategy does not, however, outline any strategic measures the AU should institute to ensure the implementation of policy statements on, for example, allocating 2% of national health budgets to research, or strengthening cooperation in health R&I. Neither does it provide for any specific institutional arrangements for monitoring, evaluating and accounting for the implementation of AU policy decisions on health research. It also does not specify financial mechanisms for its implementation.

In this regard the AU does yet not have an advanced and deliberate African-owned financial mechanism for supporting pan-African and collaborative health R&I activities (though conceivably the AESA initiative described below may help to fill this gap). Recent studies have shown that the continent's health R&I activities, as well as its participation in international collaborative initiatives, are largely dependent on external funding: at least 75% of the funding for health research in Africa is from external or non-African sources (Cardoso, et al., 2014). Due to the inherent risk of reliance on external support, this could be seen to undermine Africa's potential of realising the policy aspirations articulated in the various political declarations mentioned above and within the Africa Health Strategy.

3.4 Africa-EU financial mechanisms

There are a small number of financial mechanisms that point to a different set of models for financing bi-regional R&I. These are briefly described.

African Union Research Grants Programme

The African Union Research Grants Programme (ARGP) is funded by the EU through the EDF and administered by the AUC. So far health has not explicitly been included as a priority in the programme calls for project proposals, through a number of implicit links are evident. Priority research themes of the past ARGP calls have included agriculture, renewable and sustainable energy, and water and sanitation.

ERAfrica

A notable institutional arrangement for financing research involving African and European countries is the ERAfrica project (European Research Area with Africa: Developing African-European Joint Collaboration for Science and Technology). Designed within the broad framework of the JAES and managed under FP7, ERAfrica is an instrument for promoting Africa-EU STI cooperation through African and European partner funded projects. ERAfrica is notable because it is perhaps the *only* mechanism for ensuring that African countries contribute financial resources to Africa-EU collaborative research initiatives. ERAfrica was organised as a consortium of organisations from the following countries: Austria, Belgium, Burkina Faso, Egypt, Finland, France, Germany, Côte d'Ivoire, Kenya, The Netherlands, Norway, Portugal, South Africa, Switzerland and Turkey. A second call for projects proposals may arise under the so-called 'ERAfrica Initiative', which may help to stimulate African investment in bi-regional health R&I.

Alliance for Accelerating Excellence in Science in Africa

The Wellcome Trust, UK Department for International Development, and the Bill & Melinda Gates Foundation have partnered with the African Academy of Sciences to provide funds in the amount of US$4.5 million to establish the Alliance for Accelerating Excellence in Science in Africa (AESA). Writes Nordling (2015): "The idea is that AESA will be a platform for managing Africa-focused research programmes and a think tank to direct the continent's science". The New Partnership for Africa's Development is expected to provide AESA with USD500,000 to aid in its establishment.

3.5 Health R&I priority-setting outside of the JAES and Africa Health Strategy

There have been attempts to set health R&I priorities for international and bi-regional cooperation outside (or at least not explicitly invoking) the JAES and Africa Health Strategy. For example, health R&I priorities that pertain to both continents have been set within the context of global health initiatives such as those catalysed by the WHO, which has helped to shape the global health R&I agenda (World Health Organization, 2010). In 2008 the 61st World Health Assembly (WHA), a forum of the WHO, adopted the Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property (GSPA). The Strategy contains a general overview of global health R&I priorities and stresses the importance of building national capacities for health research priority setting. Global health R&I priorities are largely expressed in global financing initiatives and mechanisms, such as the Global Fund and GAVI. These initiatives are explicitly directed towards specific diseases of global significance. The Global Fund's research-related priorities are largely focused on epidemiological studies on the three diseases, while GAVI priorities relate to vaccine development with some direct support for clinical trials.

3.6 Discussion: No joint health R&I priority framework?

Africa and Europe have through a range of fora outlined above identified common health challenges to be addressed through various bi-regional and global cooperation arrangements. For example, within the framework of the JAES, the two regions agreed to cooperate to achieve MDGs-related health objectives, and for example, the EU's framework programmes — particularly FP6 and FP7 — have outlined areas for international R&I cooperation with Africa and other developing regions. However, most of these frameworks do not do enough to articulate specific joint health R&I priority areas or specific R&I interventions that are intended to address the identified common challenges. Put differently, the problem is not that there are not common health goals, but there is insufficient emphasis placed on the prioritisation of R&I actions that will help to tackle these common goals.

4

CONCEPTUAL FRAMEWORK AND METHODOLOGY

4.1 A typology of bi-regional cooperation

Bi-regional Africa-EU cooperation in R&I appears in a number of different forms and takes place underneath a range of governance umbrellas. At the programme or project level it is often organised in the form of networks that bring together African and European institutions and their researchers to work on R&I activities that address shared or common health challenges. However, cooperation also occurs through inter-institutional collaborations that are not necessarily networks or networked. This can take the form of two institutions — one from Europe, another from Africa — collaborating to implement a project or programme, in many instances funded by the EU or an EU member state, to conduct research or technology development activities of common interest to both the institutions or their respective host countries.

Cooperation can be visualised in the form of different levels of multi-country collaborative arrangements, as shown by a mapping of best practice Africa-EU cooperation arrangements in STI (a research report published in 2014 that we refer to here as the 'mapping study') (European Commission, 2014b). The mapping study identifies and describes the following forms of collaboration:

- **AU-EU collaboration:** The two unions collaborate to implement joint programmes or EU-funded, AU-administered programmes in Africa. An example of such bi-regional cooperation is exemplified by the ARGP.
- **AU and one or several EU member states collaboration:** This form of cooperation is where the AU is engaged with just one or several EU member states. Often the EC is not directly involved in funding and/or administering projects and programmes of this kind. An example is the African Science, Technology and Innovation Indicators (ASTII) initiative of the AU and its New Partnership for Africa's Development Programme (NEPAD), which is funded by the Government of Sweden.
- **AU member state and EU collaboration:** This is cooperation that brings together the EU and an individual AU country. It is often based on a bilateral cooperation arrangement between the EU and a particular African country.
- **Africa Regional Economic Communities (RECs) and the EU or an EU member state:** This cooperation involves an African group of countries through a REC that engage with either the EU as a whole or one of its member states.
- **AU-EU individual member states collaborative arrangements:** This is cooperation that brings together several African and several EU countries to cooperate in areas of shared R&I interest. Examples of programmes that exemplify this cooperation are EDCTP and ERAfrica.
- **Bilateral cooperation:** This is the most common form of health R&I cooperation between Africa and Europe. It involves one African country collaborating with one European country. Often the European country funds research activities in the African partner country.

These different forms of STI cooperation are funded using diverse mechanisms and have their own peculiar management situations that often influence the generation of outcomes from projects or programmes. For the purposes of this study, we have been interested in health R&I collaborative initiatives that are organised in the form of networks and/or fit in any of the forms of collaboration described above.

4.2 Assessing outputs and outcomes of cooperation in health R&I

At the conceptual level 'outputs' and 'outcomes' are often the subject of confusion. The two concepts are often used interchangeably by many researchers, project managers and even donors. Conceptual clarity pertaining what constitutes an output or outcome is very important in ensuring that investments in R&I explicitly focus on generating solutions that address the root causes of health challenges. Thus, for the purposes of this study, outputs are products of an activity and may include, for example, the number of publications generated, number of scientists trained, or number of workshops organised by a project. Outputs are really what is done or produced by a project. Outcomes emerge from outputs and are about the difference or behaviour change that is made as a consequence of the outputs. Outcomes tend to be qualitatively measured — for example they can include a reduced burden of disease, enhanced quality and effectiveness of a policy, or tangibly improved or strengthened cooperation.

Assessing outputs and outcomes of health R&I cooperation is not an easy task since there are few methodological approaches, and even fewer indicators, to be drawn on in conducting such an exercise (Lee & Bozeman, 2005). However, there is a growing body of academic and policy-oriented research on assessing outcomes of different collaborative approaches to research (Smith & Katz, 2000). Most of the studies focus on the *intermediate pathways* to outcomes, for example, the number of published science journal articles that help in the measurement of scientific productivity arising from research collaboration. Outcomes related to the types or scale of policy influence arising from research collaborations have not received much attention.

This study adopts a broader conceptual approach to assessing potential outcomes of Africa-EU cooperation in health R&I. It suggests that cooperation in health R&I is expected to generate the following *outputs with potential outcomes*:

- **New knowledge about diseases and health systems:** This is often the main output of research and is assessed in terms of the number of peer-reviewed co-authored publications generated by projects, programmes, networks, institutions, countries and regions (Lee & Bozeman, 2005).
- **New skills embodied in researchers and technicians who are able to produce more new knowledge and solutions to address specific health challenges:** This is largely about people and is measured in terms of the number of new graduates trained by projects, programmes, networks, institutions and countries as a result of collaborative initiatives.

- **New innovations often in the form of new health products (drugs, diagnostics, practices and processes) to treat diseases and manage health systems:** Innovations are outputs measured in terms of the number of patents that projects, programmes, networks, institutions and countries generate as a result of the cooperation.
- **New specific policy actions or instruments aimed at improving ways of addressing health challenges and strengthening health systems in general:** The outcome arising from this kind of output is assessed in terms of the extent to which a research cooperation initiative has influenced a country and/or region to adopt and/or reform health policy in general and policy for health R&I in particular.
- **New processes that are stimulated by collaborative research activities:** The process outputs can be measured by the number of new research initiatives, new funding, new social capital, private sector engagement, new enterprises, and new forms of networks that emerge from cooperation in R&I initiatives.

Based on the above typology the following outcome assessment matrix is used in this study.

Table 1: Outcome assessment matrix

Generic Indicator	Output Measure	Expected Outcome
Publications	No. of co-authored peer-reviewed publications generated by a collaborative initiative	New knowledge utilised to address health challenges and reduced disease burden
People	No. of persons trained in specific fields or areas pertaining to health	Skills being utilised and health systems strengthened
Product	No. of patents acquired or generated by a collaborative initiative	Health product available and being used in health systems to address specific challenges with manifested or observable reduction in diseases
Policy	No. of specific policy instruments adopted or reformed as a result of (or influenced by) collaborative research initiative	Improved or strengthened health systems
Process	No. of new initiatives launched; new funding leveraged; new forms of social capital/networks; etc.	Improved or strengthened health systems

4.3 Methodology

The research process was developed in the first instance through a review of the available reports on Africa-EU cooperation in STI in general and health R&I in particular. Information on EU-funded health R&I initiatives involving African partners was obtained from the European Commission websites:

- *http://ec.europa.eu/research/*;
- *http://www.healthcompetence.eu*; and,
- *http://cordis.europa.eu/*.

Numerous health projects funded through FP6 and FP7, including the FP7 Africa Call (see Appendices C-F), and special initiatives such as the EDCTP and the ACPS&T Programme were identified. The review of pertinent literature also helped the research team to map out the relevant policy instruments, specific joint health R&I priorities (where these exist), financing mechanisms or frameworks, and their R&I coverage. Project evaluation and annual reports were reviewed as part of the desk review work, especially in relation to the case study presented in sub-section 5.

Using a semi-structured questionnaire, face-to-face, telephone and email interviews were conducted with:

- nine professionals who have held responsibility for implementing Africa-EU R&I initiatives;
- three policymakers that have been engaged in policy dialogues on STI within the JAES framework; and,
- three professional employed by private companies in South Africa.

Representatives of the private sector and other key informants for this research were engaged in group discussions held at CAAST-Net Plus workshops in Entebbe, Uganda (November 2014) and in Cape Town, South Africa (December 2014).[4]

The review of literature also guided the design of criteria for selecting initiatives to be subjected to more detailed outcome assessment. Five specific criteria for selection of initiatives included:

- Initiatives must have an explicit focus on scientific research in health and/or an explicit focus on generating innovations associated with health products and/or processes.
- Initiatives must be designed and implemented through multi-country arrangements that involve at least one African and one EU country.
- Initiatives must explicitly focus on shared or common health challenges.
- Initiatives must have been implemented for a period of at least three years within the frameworks of FP6, FP7, and the ACPS&T Programme.
- Initiatives must have annual or evaluation reports.

[4] *https://caast-net-plus.org/object/news/955*.

Projects profiled in the next sub-section are discussed to illustrate the indicative nature of outputs and potential outcomes of bi-regional cooperation. These projects do not however represent a full sample of collaborative initiatives involving both African and European partners. One relatively large programme (EDCTP) was selected for a detailed analysis in this report. We relied on available EDCTP annual reports, key informant opinions and past evaluations that we were able to access and review within our research constraints. This was done for illustrative case study purposes and therefore it should not be considered as the only Africa-EU health R&I initiative with or demonstrating potential outcomes.

4.4 Research limitations

While we make some attempts to meaningfully analyse outputs and outcomes of some of the initiatives or projects surveyed in this research, it is important to emphasize that the study relied on a relatively narrow range of information sources. As such it is unable to make conclusive judgements about the actual impacts of specific projects. All study limitations we accept as our own.

5 MAPPING BI-REGIONAL HEALTH R&I PROJECTS AND PROGRAMMES

This section provides a mapping of Africa-EU health R&I projects and initiatives. The analysis focuses mainly on multi-country initiatives funded between 2002 and 2013 under FP6, FP7 and the ACPS&T programme. For illustrative purposes a small number of bilateral health R&I cooperation initiatives are also described.

5.1 FP6 health R&I cooperation initiatives

Framework programme 6 (FP6) is recognised as the first EU instrument to fund bi-regional health cooperation between Africa and Europe. Prior to its establishment health cooperation initiatives between the two regions were largely funded through the bilateral instruments of EU member stated. FP6 supported 23 health collaborative projects with African partners (Appendix C) of which 12 projects covered health R&I activities (Table 2). The total FP6 EC contribution to Africa-EU health cooperation was approximately EUR 40.8 million, of which about 55.5% (approximately EUR 22.6 million) was dedicated to health R&I initiatives (Appendix D). The 12 health R&I initiatives focused mainly on neglected diseases, such as sleeping sickness, river blindness, helminth infections, viral diseases (HIV/AIDS), and malaria.

Table 2: Thematic outlook of FP6-funded health projects

Thematic Area/Domain	Number of Projects	List of Project Acronyms
General Health Non-scientific research and innovation with an emphasis on healthcare, health systems strengthening, health policy, health ethics, health policy research and analysis, policy advocacy.	11	PILDU, FAHOPHS, REACT, GHIS IN AFRICA, AUDOBEM-AFRO, SUPPORT, SHIELD, ARVMAC, PROMISE COMPONENT-2, NEBRA, HATCAP
Health Scientific Research Basic research with an emphasis on the production of new scientific knowledge.	1	TRYLEIDIAG
Health Scientific Research and Innovation Basic and applied research, including aspects such as clinical trials, research.	8	SCHISTOINIR, TRANCHI, MUSTSCHISTUKEMA, NEUROTRYP, CONTRAST, TFCASS, BURULICO, CAPABILITY
Health Innovation Application of existing knowledge to develop health products.	3	SCOOTT, VHF Diagnostics, SODISWATER
TOTAL	**23**	

Funding levels for the FP6 R&I projects surveyed varied between approximately EUR 850,000 to EUR 2.9 million. The project that received the largest amount of funding was CONTRAST, with an EC contribution of EUR 2.9 million. This four-year project focused on generating scientific knowledge on biological and environmental factors causing the spread of schistosomiasis in sub-Saharan Africa. It also aimed at developing technologies to improve the control of this disease. African countries involved in this project were Cameroon, Kenya, Tanzania, Senegal, Uganda, Niger and Zambia. One key result of the partnership was a resolution by the WHA calling upon member states to intensify schistosomiasis control (Utzinger, et al., 2013).

TRYLEIDIAG is another FP6 health R&I project that received significant funding, with an EC contribution of EUR 2.39 million. The aim of the project was to develop and validate sensitive point-of-care diagnostic tests for Human African Trypanosomiasis (HAT) and leishmaniosis. Four African countries — Uganda, Kenya, Sudan and the Democratic Republic of Congo — participated in this project. The project has evolved into a research consortium that has developed simplified molecular-based diagnostic tools.[5]

Other FP6-funded projects that had budgets and EC contributions above EUR 1.5 million included BURULICO, TFCASS and SCHISTOINIR. BURULICO was implemented through a partnership involving Germany, Belgium, Benin, the Democratic Republic of Congo, The Netherlands, and Ghana. One of the project's outputs was the development and testing of streptomycin rifampicin (SR), with WHO approval, to treat Buruli ulcers. TFCASS received approximately EUR 2.5 million from the EC. Its aim was to eradicate tsetse flies and control African sleeping sickness. African countries participating in the project are Kenya, Uganda, Côte d'Ivoire, Guinea and Burkina Faso. With a EUR 2 million contribution from the EC, SCHINSTOINIR focused on developing and applying immunoregulatory molecules to control infection of the parasite Schistosoma. African countries that participated in the project included Senegal, Ghana and Gabon.

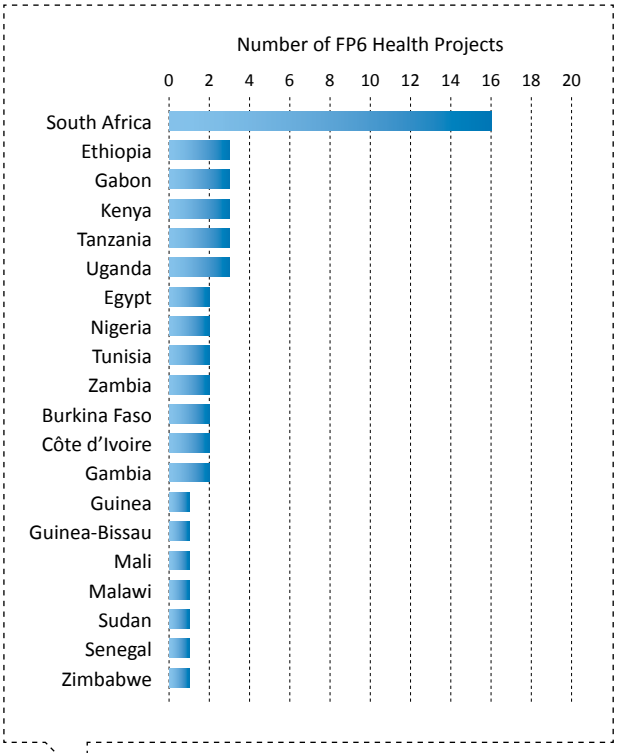

Figure 1: African country participation in FP6 health projects
Source: *MoEST*

[5] http://www.tryleidiag.org

SODISWATER is an example of a project that aimed to utilise existing knowledge to develop health innovations as well as to produce new scientific knowledge on improving healthcare in developing countries. With the EC's EUR 1.9 million contribution, the project developed tools and approaches for inactivating pathogens and develop solar-based technology for disinfecting drinking water. Kenya, South Africa, and Zimbabwe participated in this project.

Overall a total of twenty African countries participated in FP6 health projects. South Africa participated in the largest number of projects followed by Kenya, Uganda and Tanzania (see Figure 1, based on projects listed in Appendix C). Two reasons why South Africa enjoyed the highest participation rate in FP6 health cooperation initiatives include its relatively conducive infrastructure for scientific research and its bilateral STI cooperation agreement with the EU.

FP6 also focused on diseases emerging from environmental change with direct impacts on European human populations. A project spanning more than five years, the Emerging Diseases in a Changing European Environment (EDEN) project received funding in the amount of approximately EUR 15.4 million, with a direct EC contribution of approximately EUR 11.5 million.[6] EDEN focused on identifying and cataloguing European ecosystems and environmental conditions linked to global change. The diseases that the project studied included tick- and rodent-borne diseases, Leishmaniosis, West Nile fever, malaria and Rift Valley Fever (RVF) that are endemic to regions of West and North Africa. African countries involved in this project were Algeria, Morocco and Senegal.

EDEN was directly targeted at the vector-borne diseases affecting both continents and has contributed significantly to modelling the conditions for vector-based diseases to occur and spread, depending on the region and time of year. It has provided evidence that adult mosquitoes (Culex spp.) can ensure overwintering of the West Nile Virus (WNV) in Europe, hence virus introduction from Africa by migratory birds is not necessary to trigger WNV outbreaks, which is of major importance to prevent or alleviate large scale WNV epidemics (European Commission, 2012a). Among its outputs and outcomes are more than 200 scientific publications, with new knowledge that influenced EU climate change and public health policies, and at least 60 students with post-graduate degrees (European Commission, 2012b).

Another significant FP6 health project, which was subsequently extended into FP7, is BIOMALPAR (Biology and Pathology of the Malaria Parasite).[7] The project's total budget was approximately EUR 85.8 million, with an EC contribution of EUR 16 million over a five-year period. BIOMALPAR was executed through a network of European and African researchers working on the molecular and cellular biology of malaria. The network included 17 research institutes and universities from seven

[6] *http://www.eden-fp6project.net/*

[7] *http://cordis.europa.eu/result/rcn/49786_en.html*

European countries as well as three African partners from Mali, Sudan and Uganda. One of the objectives of BIOMALPAR was to decipher the basic mechanisms of pathogenesis and crucial parasite specific pathways. In addition to its scientific research, the project focused on the development of novel technologies and molecules that are targets for intervention strategies. BIOMALPAR generated the following outcomes:

- It increased the coordination of new collaborative projects between institutional laboratories within Europe and with African partners, and reduced redundancy in malaria research.
- It helped to shape EU policy on malaria.
- It supported African partners to establish state-of-the-art malaria research facilities.
- The project trained more than 70 master's and 15 PhD graduates in both Europe and Africa.
- It generated at least 50 co-authored peer reviewed scientific publications.
- BIOMALPAR led to advances in the discovery of new parasite molecules with a high potential for antimalarial therapy.

Projects like BIOMALPAR also significantly contributed to the creation of standardised, coordinated and structured European Research Area (ERA), of which the European Malaria Graduate School (EMG), created under EVIMalaR as a follow up to BIOMALPAR, is an example. EMG has produced more than 50 European and African PhD candidates in the field of malaria research and has significantly increased the coordination of new collaborative projects between institutional laboratories within Europe and with African partners. The number of publications released by the consortium's members stands at 400, which includes a large number of papers in high profile publications (*Nature, Cell, Science*, and others). Europe is now recognised as the world leader in the biology of the malaria parasite (European Commission, 2011). Similarly, scientists in the European Microbicides Project (EMPRO) developed novel anti-HIV microbicides. A consortium of 27 partners including Stellenbosch University in South Africa succeeded in taking several monoclonal antibodies to the clinical trial stage and over the longer-term it is conceivable that new microbicides might emerge from the EMPRO project (European Commission, 2012b).

FP6 generally placed emphasis on the engagement of the private sector and, in particular, the participation of SMEs in joint health R&I projects. In this regard at least 15% of financial resources for each of the programme's thematic areas were envisaged to be allocated to SMEs. The FP6 thematic area on life sciences and biotechnology, for instance, "emphasize[d] the importance of innovation and the integration of SMEs in order to reach the Lisbon goal by ensuring that new knowledge is disseminated and translated into new therapies and clinical practice" (European Commission, 2005). FP6 also encouraged the participation of *high-tech* SMEs as well as those that could provide services such as expertise in the management of intellectual property. According to the EC's FP6 evaluation, SMEs' participation in FP6 projects are recognised as having contributed to the development of new technologies (European Commission, 2012b).

5.2 FP7 health R&I cooperation initiatives

Framework programme 7 (FP7) contained explicit provisions for international cooperation in various domains of STI between the EU and third country partners from Asia, Africa, Latin America, and European non-EU member states. Its overall budget was about EUR 53.2 billion for a period of seven years (European Commission, 2011). The highest participation of non-European countries in FP7 has been quantified as follows:

- Russia (408 participations);
- USA (318 participations);
- China (263 participations);
- India (230); and,
- South Africa (184).

Among the top 20 there are five more African countries:

- Egypt (94 participations);
- Tunisia (68 participations);
- Kenya (59);
- Ghana (46); and,
- Tanzania (44) (European Commission, 2013).

The programme's overall goals were to expand and strengthen the ERA and to contribute to the development of a knowledge economy and society in Europe. Funding was directed toward a variety of research themes, such as health, food, agriculture and fisheries, nanoscience and nanotechnology, energy, environment (with an emphasis on climate change), space science and space technologies, transport, and social sciences and humanities. Many environmental projects focused on the health impacts of global environmental change in general and climate change in particular, as well as the development of tools and methods for environmental health risk assessment. A significant number of projects focused on genotoxic studies, mutagenic effects, developing tools, and methods and models to improve the assessment of environment-health relationships.

Collaborative health initiatives were funded and implemented in various countries and regions of the world through the FP7 international cooperation programme. The mapping conducted for this report identified 30 specific FP7-funded health projects that were implemented involving African countries (Appendix E). The total EC contribution to the 30 projects was approximately EUR 97.5 million (which includes the budget for participants from Europe and other regions). Of the 30 projects mapped, 21 covered general health issues, such as health systems strengthening, health policy research and advocacy, healthcare, health equity, and access to care and medicines. Eight focused on scientific research and innovation. One project focused on innovation. The nine projects on health R&I (row 2 and 3 in Table 3 overleaf) received approximately EUR 37.4 million from the EC for all participants. This represents about 38% of the total EC contribution to health cooperation with Africa under FP7.

Table 3: FP7-funded Africa-EU health cooperation initiatives according to thematic areas/domains

Thematic Area/Domain	Number of Projects	List of Project Acronyms
General Health Non-scientific research and innovation with an emphasis on health care, health systems strengthening, health policy, health ethics, health policy research and analysis, policy advocacy.	21	AMASA, EQUITABLE, IntHEC, INTREC, QUALMAT, DIFFER, EVAL-HEALTH, SDH-Net, ATP, UNITAS, E-PIAF, SURE, RN4CAST, HEALTH INC, REACHOUT, FEMHEALTH, COSMIC, PREPARE, GO4HEALTH, MM4TB, HEALTH-NCP-NET
Health Scientific Research and Innovation Basic and applied research, including aspects such as clinical trials, research and product development, translational research.	8	HEALTHY FUTURES, GENDRIVAX, BURULIVAC, THINC, CHAIN, HOMITB, TBSUGENT, EUCO-Net
Health Innovation Application of existing knowledge to develop health products.	1	AFRICOLEISH
TOTAL	**30**	

Compared to FP6, FP7 health R&I projects received relatively large funding amounts per project. The lowest FP7-funded project was TBSUSGENT (Sustaining Research Momentum Over the Coming Decades: Mentoring the Next Generation of Researchers for Tuberculosis), which received an EC contribution of about EUR 1 million. The highest funded project was MM4TB (More Medicines for Tuberculosis), which received an EC contribution of approximately EUR 11.9 million. At least 45% of the EC's total contribution to collaborative health R&I initiatives was directed at developing vaccines and drugs for infectious diseases, particularly HIV/AIDS, tuberculosis and malaria.

The number of African countries participating in FP7 health R&I projects was 31 (Figure 2). Participation is attributable to a range of factors: First, unlike FP6, FP7 had an explicit goal to promote international collaboration in R&I. Specific programmes for international cooperation and resources, such as CAAST-Net and CAAST-Net Plus, were dedicated to promoting the involvement of third countries (non-EU member states or associated countries) in EU-funded initiatives.[8] Second, many African countries have built and accumulated scientific and technological capacities to engage with the EU in health R&I — for example, through bilateral health cooperation initiatives many countries have cohorts of researchers and relatively good RIs that tend to attract EU scientists.[9]

[8] *http://www.elearningsite.eu/extras/fp7_guideline_third_country_participants.pdf*

[9] This opinion was expressed by at least two persons interviewed for this study and also by speakers at the CAAST-Net Plus workshops in November and December 2014.

In some African countries, for example in Kenya and South Africa, workshops have been organised to build local researchers' awareness of FP7 and ways of participating in the programme. A number of the interviewees for this study associated the relatively high number of African countries participating in FP7 to the outreach activities of CAAST-Net and CAAST-Net Plus.

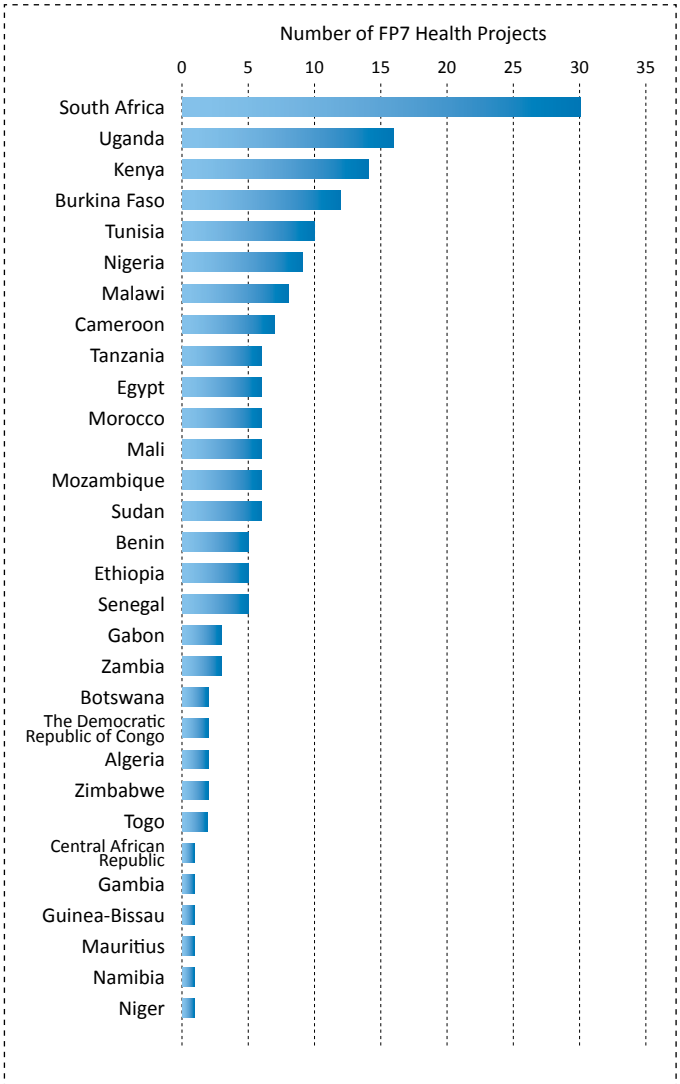

Figure 2: African country participation in FP7 health projects.
Source: *MoEST*

In addition to the projects listed in Appendix E the EC financed a range of health cooperation projects under the Africa Call (Appendix F). The Africa Call responded to the science and technology objectives of the JAES second action plan, enhancing bi-regional cooperation in health, food, agriculture, fisheries, and environment (including climate change). Within the health theme of the Africa Call the following topics were published:

- 2.3.2-4: Controlling malaria by hitting the vector: New or improved Vector Control Tools;
- 2.4.1-4: Infectious agents and cancer in Africa;
- 3.4-1: Develop and assess key interventions and policies to address the human resource crisis in the health sector;
- 3.4-2: Feasibility and community effectiveness of innovative intervention packages for maternal and new-born health in Africa;
- 3.4-3: Building sustainable capacity for research for health in Africa; and,
- 3.4-4: Assessment of migrants' health, disease patterns and impact on health systems.

A total of 26 projects were financed through the FP7 Africa Call. Of the funded projects, 15 projects fell within the health theme, receiving a total EC financial contribution of EUR 47 million. Most of

the health projects responded to topic 3.4-3: Building sustainable capacity for research for Health in Africa. These projects were funded by the EC as coordination and support actions, typically receiving a maximum EC contribution of EUR 2 million. Three of the 15 projects focused on health R&I and were allocated approximately EUR 18 million (about 38.1% of the total EC financial contribution to Africa Call health projects). Two projects were focused on developing biotechnology R&D infrastructure in Africa, with funding of about EUR 3.7 million (approximately 7.8% of the funding for Africa Call health projects). The three health R&I projects funded by the Africa Call concerned malaria and cancer:

- Africa Vector Control New Tools (AvecNet) (see Box 1);
- HPV in Africa Research Partnership (HARP) (focusing on cervical cancer); and,
- Prevention of Liver Fibrosis and Cancer in Africa (PROLIFICA).

It is notable that two projects on cancer research evolved from the Africa Call given that the burden of non-communicable diseases is gradually increasing in Africa.[10]

Box 1. Project African Vector Control (AvecNet)[11]

The AvecNet project received the largest amount of funding from the FP7 Africa Call (EUR 12 million). The duration of AvecNet was five years from 2010 until 2015. It was organised as a consortium whose main objectives were to develop scientific knowledge about the behaviour of mosquitoes as well as about tools for malaria vector control. The project also aimed to build capacity through support for PhD and MSc training. African countries involved included Malawi, Burkina Faso, Tanzania and Kenya. European countries included the UK, Switzerland, Greece, France and Italy. Key outcomes of this project include:

- a non-lethal mosquito tracking system which enables mosquito behaviour to be monitored in the dark;
- eight PhD students in training;
- at least three published journal articles; and,
- a large-scale clinical field trial of a new vector control tool based on the project's previous research.

In addition, the project actively disseminated information to the EU, WHO and national authorities with the aim of influencing malaria control policies.

Research areas the project focused on included:

- mapping, examining and anticipating future risks of water related vector-borne diseases in Rwanda, Uganda and Kenya;
- reducing maternal and newborn mortality in Malawi, Kenya, Burkina Faso and Mozambique;
- African Regional Capacity Development for Health Systems and Services Research involving Malawi, Tanzania, Uganda and South Africa;
- the Consortium for Health Policy and Systems Analysis involving Ghana, Kenya, Tanzania, Nigeria and South Africa; and,
- developing new tools for African vector control.

10 Cervical cancer for example is almost entirely preventable through screening and vaccination against the infectious agents.

11 *www.avecnet.eu/about-about-avecnet/*

5.3 ACP Science and Technology Programme health R&I initiatives

The African Caribbean Pacific Science and Technology Programme ('ACPS&T Programme') supports ACP countries to formulate and implement S&T policies for sustainable development and poverty reduction. It focuses on strengthening the capacity of ACP countries to coordinate and manage research activities, promote networking, and enhance the quality of their research programmes. The programme was designed in the context of the 2006 EU Sustainable Development Strategy and the Strategic European Framework for International Science and Technology Cooperation.[12] A first call for proposals was published under the ninth EDF in 2008; a second call for proposals was launched in 2012, under the tenth EDF. According to the programme's website 67 projects have been funded by this initiative to date.[12]

Thematically, the ACPS&T Programme focuses primarily on agriculture, energy and environment. Health and quality healthcare are also focus areas, with special attention paid both to traditional and biodiversity-dependent community medicine, and to developments taking place within biotechnology. Four ACPS&T health projects were analysed in this study with one focusing specifically on health R&I (Table 4).

Table 4: Health R&I funding in the ACPS&T Programme

Theme	Number of Projects	Total EU Funding (€)
Health policy	1	967,741
Health research / Generation of new knowledge / Innovation	1	994,903
Healthcare delivery systems	2	1,435,776
TOTAL	**4**	**3,398,420**

In terms of outputs and outcomes, projects funded by the ACPS&T Programme show some similarities to projects funded under FP6 and FP7. For example, the Community-based Systems in HIV Treatment project (CoBaSys) has described its key outputs as, principally:

- a model of a community-based healthcare system;
- policy-related publications; and,
- newsletters, a project website, leaflets and brochures.

12 http://ec.europa.eu/research/press/2008/pdf/com_2008_588_en.pdf

13 http://acp-st.eu

The following outcomes were identified by the project partners:

- Community approach and participatory method in defining a quality healthcare system in the field of HIV treatment.
- Community-based healthcare system model promoted in six African countries.
- Sustainable networks among partners, community and other stakeholders at regional level developed.
- Stable cooperation established among African and EU partners (ACP Secretariat, 2010).

5.4 Bilateral health R&I cooperation: Illustrative examples

There are a plethora of bilateral health R&I cooperation initiatives involving African and EU member states. This section describes a limited number of examples for illustrative purposes.

South Africa alone has bilateral health R&I cooperation initiatives with at least 10 of the 28 EU member states. Most of these initiatives are based on formal bilateral STI agreements. They vary in scope and funding levels as well as in their research priorities. Italy, for instance, cooperates with South Africa in health biotechnology research focusing on infectious diseases with emphasis on HIV/AIDS, malaria, tuberculosis, trypanosomiasis, leishmaniosis and schistosomiasis as well as on non-communicable diseases, particularly cancer. This bilateral cooperation is enforced by the International Centre for Genetic Engineering and Biotechnology (ICGEB). ICGEB has a Biotech Transfer Unit for the development of technologies for biogeneric pharmaceuticals, industrial enzymes and other bio-molecules with potential industrial applications.

The Swiss National Science Foundation (SNSF) and the National Research Fouincation (NRF) in South Africa have a collaborate Swiss-South African Joint Research Programme (SSAJRP) to fund joint research projects. The programme covers a range of priority areas including the development of anti-malarial formulations and therapeutic research on drug-resistant malaria parasites. The cooperation also covers the development and characterisation of shigella vaccines and involves the private company Glyco Vaxyn AG.[14]

Germany cooperates with many sub-Saharan African countries in health R&I. The German Research Foundation (DFG) has a funding scheme for joint research projects between scientists in Germany and Africa investigating infectious diseases and their social implications. DFG cooperation with Tanzania, for instance, includes an international research and vaccine development project on HIV/AIDS. Tanzania's Mbeya Medical Research Center and the Department of Infectious Diseases and Tropical Medicine at the University of Munich in Germany are the main partners in the project.[15]

[14] *http://www.esastap.org.za/download/present_saeu_03_2014.pdf*

[15] *http://www.mmrp.org/*

This cooperation has generated a range of outputs including publications co-authored by Tanzanian researchers and researchers from Germany, the UK and USA, as well as several clinical HIV/AIDS vaccine trials, one of which is the so-called ALISA trial — a multicentre Phase III trial of second-line antiretroviral treatment strategies in adults in Tanzania and South Africa. The EDCTP is one source of funding for this clinical trial.

In addition to many government-led bilateral initiatives, there are also many inter-institutional Africa-EU partnerships on health R&I. For example, the Kenya Medical Research Institute (KEMRI) has a long-standing partnership with the UK's Wellcome Trust, a medical research charity, covering a range of health R&I activities on malaria, maternal health, non-communicable diseases, vaccine development, development of diagnostic kits for infectious diseases, and pneumococcal epidemiology.[16] This cooperation has generated a range of outputs, including at least 60 co-authored peer reviewed publications by Kenyan and UK scientists; at least 10 PhD and 40 master's degree graduates; and the establishment of state-of-the-art RI in Kilifi, Kenya. Two of the interviews for this study identified policy influence as another potential outcome of this cooperation: KEMRI-Wellcome Trust scientific research has been a source of policies on HIV/AIDS and malaria in East Africa.

In 1996 and under the leadership of Dr Pedro Alonso and with the support of the *Hospital Clínic de Barcelona*, Spain founded the Manhiça Health Research Centre in Mozambique (CISM).[17] Over the past 20 years, CISM has become a recognised scientific centre with strong collaboration ties to the University of Barcelona and the Barcelona Centre for International Health Research (CRESIB). In recent years CISM carried out biomedical research in priority areas such as a Phase II clinical trial of the AERAS-402 tuberculosis vaccine candidate in children. The institute also participates in both FP7 and EDCTP projects.

In sum, bilateral cooperation between African and European countries is vast and generates a wide range of health R&I outputs and potential outcomes that are relevant to addressing global health challenges. Some of the distinctive characteristics of the cooperation identified from research interviews and desk review reports are informative in what they reveal about the nature of the cooperation:

- Funding is largely drawn from European sources with little-to-no financial contribution from African partners.
- Private sector engagement exists, although the participation of African SMEs is very limited.
- Bilateral R&I cooperation contributes to the development of RIs in Africa.

16 *http://www.kemri-wellcome.org/*

17 *http://www.manhica.org/eng*

5.5 Private sector participation in Africa-EU health R&I cooperation

The role of the private sector — both for-profit and non-profit organisations — in health R&I is explicitly recognised by various policy instruments of the AU, EU, individual African countries and EU member states. The JAES and the AU's Africa Health Strategy both have provisions that emphasize ensuring and strengthening the participation of the private sector in R&I in order to secure common health goals (paragraph 61 of the JAES, for example, underscores this point). The nature of the participation encouraged at the policy level takes a number of forms: The involvement of the private sector in health sector development and financing, for example through public-private partnerships, is encouraged. So is the production of and access to generic medicines. Research into vaccines and new medicines for both major and neglected diseases, and research into issues relating to water-borne diseases, as well as research on the clinical effectiveness of traditional medicine also encompasses private sector involvement in bi-regional health R&I (African Union-European Union, 2007a).

At the practical level, private sector engagement in Africa-EU health R&I cooperation can be thought of in at least four distinct ways:

1. **Private companies can be directly involved in the conduct of health R&I:** This type of engagement is exemplified in the case of, for example, European pharmaceutical companies that have a presence in Africa. Some of these companies have research laboratories in African countries and are also involved in executing joint Africa-EU health research projects.
2. **Private sector actors can finance research that brings together African and EU scientific expertise from multiple countries:** There are several European private sector institutions that fund collaborative research in Africa. Two examples are the UK's Wellcome Trust (a charity) and Pfizer (a multinational pharmaceutical company).
3. **Private sector actors can also be engaged through public-private partnerships, such as Product Development Partnerships (PDPs):** An example of a PDP is the Drugs for Neglected Diseases Initiative (DNDI), which involves universities in Ethiopia, South Africa and Uganda, universities in the UK, Belgium and Spain, as well as pharmaceutical giant GlaxoSmithKline (European Commission, 2013).
4. **The private sector's participation in Africa-EU health R&I initiatives can also emerge in the form of companies donating drugs or providing other in-kind contributions, such as data or information sharing:** Initiatives where private sector engagement takes this form can be found under the umbrella of the EDCTP.

The private sector's participation in Africa-EU health R&I initiatives has increased from FP6 to FP7 (Table 5). It should be noted that a significant number of private sector representatives within these initiative are European SMEs, some of which are directly engaged in R&D or in providing specialist management services to these projects.

Table 5: Private sector engagement in Africa-EU health R&I initiatives

Funding Instrument	Number of analysed projects	Number of projects with private sector engagement	Percentage
FP6 (2002-2006)	23	9	39%
FP7 (2007-2013)	45	24	53%
*EDCTP	15	12	
*ACP S&T Programme	4	4	

Source: *MoEST*

The engagement of the private sector in Africa-EU collaborative health R&I initiatives is likely to grow as a result of the more recent deliberate policy measures being instituted by the EU, African countries and EU member states, as well as various regional bodies to promote a role for the private sector. According to a study conducted for the UK Parliament (2013):

> [The European Commission] has set up various mechanisms, such as the industry-led European Technology Platforms, which provide formal and informal frameworks for stakeholders to shape and define EU research priorities. […] Private sector participation in the EU Framework Programme for Research and Technological Development (FP) has steadily increased in recent years.[18]

The increase of private sector participation in EU health R&I initiatives can also be understood in the context of the EC's decision to encourage an increase in the participation of SMEs in FP7. As a consequence the number of SMEs involved in Africa-EU partnerships has also increased. However, through the research conducted for this study, we were unable to identify specific *African SMEs* that have participated in these projects, or that are currently involved in other forms of Africa-EU health R&I cooperation.

Several challenges constrain engagement by the private sector. Most of the challenges outlined below are drawn from opinions expressed by key informants interviewed for this study:

- There is poor and irregular information on the African research-performing private sector in general and SMEs in particular.
- Weak intellectual property rights in many African countries tend to restrain companies from participating in collaborative product development initiatives.

[18] *http://www.publications.parliament.uk/pa/ld201213/ldselect/ldeucom/162/16208.htm*

- Cumbersome and, in many cases, absent regulatory frameworks or bureaucratic institutions make it costly and time-consuming to conduct clinical trials in many African countries.
- The African private sector, particularly SMEs, is not particularly interested in undertaking scientific research.
- Weak policies, particularly a lack of venture capital and fiscal incentives, lead to a lack of incentives for African private sector participation in health R&I.
- African partners in EU-funded collaborative health R&I do not often engage with private sector institutions in the design of proposals and often tend to reach out to the private sector towards the end of their research activities.
- The absence of an explicit AU strategy for private sector participation in STI in general and health R&I in particular constrains interest and participation.

African private companies are also under-represented in public exhibitions, such as the Africa Health Exhibition and Congress, held annually in Johannesburg, South Africa. At the 2015 event, over 500 private sector exhibitors from over 40 countries vied for the attention of 7,000 delegates, mainly healthcare professionals from South Africa. Over 100 companies were from China and from Europe, Belgium fielded 17 companies, Germany 29, Italy 10 and the UK 12 (Musolino & Kuss, 2016). Strikingly, no companies of African origin attended the event.

In contrast, the interest of American, European and Asian companies to enter the African healthcare markets and to participate in global health research is increasing rapidly. One of the companies engaged in extensive R&I in Africa is GE. In 2008 GE had US$3.5 billion in revenues and over 1,500 employees in Africa. In 2013 GE revenues exceeded US$5.2 billion across 30 African countries. Africa has emerged as the most promising growth region for GE (GE Africa, 2014). A similar optimism is felt by the German African Business Association (Afrika Verein). A recent Afrika Verein magazine carried the title 'Health, Africa!: The economy booms, middle class grows – Africa gains interest by the health sector'. While the benefit to the German private sector from African health investment has been moderate, it is speculated that it might change soon (Afrika Verein, 2014).

An increased engagement of the European private sector in bi-regional health R&I cooperation can be observed in the recent funding of Ebola projects by the Innovative Medicines Initiative (IMI). IMI is a partnership between the EU and the European pharmaceutical industry, represented by the European Federation of Pharmaceutical Industries and Associations (EFPIA). The total budget of the eight projects launched is EUR 215 million, covering vaccine development and manufacture, vaccine uptake, and diagnostics. The projects are part of the wider IMI Ebola+ programme, from which support derives from Horizon 2020 and the EFPIA partners in the projects.[19]

[19] *http://www.imi.europa.eu/content/ebola-project-launch*

The EDCTP has expressed its interest to establish collaborations with the private sector. Recent key events the EDCTP has arranged include their 'Pharmaceutical Industry Workshop' and a meeting on 'Post-Registration Medicinal Products Safety Monitoring in sub-Saharan Africa'. These larger events have complemented individual EDCTP meetings with private sector stakeholders.[20]

Overall, the participation of private sector actors in bi-regional health R&I cooperation is found to be constrained by a range of factors. These factors include an inadequate or insufficiently supportive policy environment as well as the absence of health research-oriented SMEs in most African countries. While the EU has a range of policy instruments and funded programmes for encouraging the participation of the private sector in general and SMEs in particular, African countries and the AU do not. Many of the interviewees consulted in this study identified policy deficits such as weak or absent of intellectual property protection, lack of venture capital funding and R&D tax relief, weak links between research institutes and industry, and lack of information on bi-regional health R&I priorities and initiatives as the main factors accounting for limited African private sector and SME participation in the cooperation.

5.6 Other framework conditions

This research also identified a number of other barriers impacting on health R&I cooperation between Africa and Europe. Very briefly, these include:

- limited access to scientific information and published data;
- limited R&I budgets;
- temporary contracts;
- poor career prospects; and,
- complicated bureaucracy.

Scientists also experience external pressures particularly in situations where research data discloses information with potential to compromise economic and political interests. The lack of high tech or advanced labs and inadequate local resources promotes reliance on foreign partner support that may not be well aligned with the interests and needs LDCs. At the interface of research and policy, few initiatives surveyed in this study were able to demonstrate explicit policy outreach and advocacy strategies. Where this was demonstrated initiatives had platforms or processes for promoting interactions between researchers and policymakers. Such platforms or processes include the participation of policymakers in the governance of projects and science-for-policy dialogues.

[20] *http://www.edctp.org/annualreport2014/edctp2.html*

6

OUTPUTS AND POTENTIAL OUTCOMES OF BI-REGIONAL COOPERATION: THE CASE OF EDCTP

This sub-section provides an illustration of outputs and potential outcomes of bi-regional health R&I cooperation by referring to the case of the European and Developing Countries Clinical Trials Partnership (EDCTP). EDCTP is considered to be a successful Africa-EU health R&I initiative, which has generated a range of results in health R&I. This assessment is based on the 5Ps conceptual framework (see p. 18), analysing EDCTP results in relation to publications, people, products/patents, policy and processes.

6.1 Formation and establishment

The first phase of EDCTP was established in 2003 by 16 European countries and the European Union under Article 185 of the Treaty on the Functioning of the European Union (TFEU). It was the first ever application of Article 185 and therefore a pioneering instrument in the development of a health R&I partnership between European and African countries. The second phase (EDCTP2) was established at the end of the first phase in 2013, and covers the period 2014-2023. The countries participating in EDCTP as members of the EDCTP Association include 14 European countries (Austria, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, UK), and 14 African countries (Burkina Faso, Cameroon, Congo, Gabon, The Gambia, Ghana, Mali, Mozambique, Niger, Senegal, South Africa, Tanzania, Uganda and Zambia). The scope of EDCTP2 was expanded through the inclusion of a focus on neglected infectious diseases. The programme now aims to accelerate the development of "new or improved drugs, vaccines, microbicides and diagnostics against HIV/AIDS, tuberculosis and malaria as well as other poverty-related and neglected infectious diseases in sub-Saharan Africa, with a focus on phase II and III clinical trials".[21]

6.2 Phase I results

EDCTP1 supported 246 projects with a total contribution of EUR 212 million over the period 2003-2013. Many of these projects leveraged co-funding from other sources and therefore the actual value of these projects is EUR 383 million.[22] EDCTP projects focused on a wide array of activities:

- **Integrated projects:** Clinical trials as the core activity with associated capacity building and networking activities;
- **Ethics:** Establishing, strengthening and mapping of national ethics committees and institutional review boards;
- **Fellowships:** Personal awards to African researchers, with a focus on senior fellowship awards to develop African research leaders and building research teams;

21 http://www.edctp.org/

22 http://www.gov.za/eu-and-africa-foster-closer-ties-fight-dangerous-diseases

- **Regional networks of excellence for conducting clinical trials:** Collaborative support for regional consortia; and,
- **Short-term grants:** Awards that provide seed funding for researchers to explore novel and innovative lines of research that may lead to the development and testing of new or improved clinical interventions (EDCTP, 2014).

EDCTP projects have generated significant results, some of which are documented below (Table 6).

Table 6: Outputs and indicative outcomes of EDCTP (2003-2013)

Generic Indicator	Output Measure	Indicative Outcome
Publications	Approximately 35 co-authored journal articles published in international journals.	Expanded knowledge base for developing vaccines against HIV/AIDS, malaria, TB and various neglected infectious diseases.
People	More than 200 master's degrees, 177 PhDs, 39 post-doctoral researchers, and at least 50 researchers (senior fellow-level) trained in various areas, particularly clinical and epidemiological research as well as ethics research and management.	Increased capacity of African researchers and institutions to engage in clinical and epidemiological research as well as in research on health ethics.
Product	At least 19 clinical trials conducted or completed and registered with ClinicalTrials.gov (for example, REMox TB). WHO-recognised Pan-African Clinical Trials Registry (PACTR) established.	Potential vaccines developed and used to treat HIV/AIDS, TB and malaria.
Policy	At least nine sub-Saharan African countries established ethics guidelines and regulatory frameworks for clinical trials. Institutional Review Boards established in at least 34 African countries.	Improved ethical environment for health R&I in Africa.
Processes	Four African Regional Networks of Excellence for clinical trials established. EDCTP Participating States have collaborated in 103 EDCTP-funded projects in sub-Saharan Africa. Increased networking in Africa as participation rose from 13 African countries and 20 African institutions in 2005 to 30 countries and 165 institutions by December 2013.	Increased institutional synergies and strengthened national health systems.

Box 2. EDCTP1 achievements in medical interventions against HIV/AIDS, malaria and TB

Under EDCTP1, 55 research projects involving 88 clinical trials were funded, promoting Africa-EU and notably trans-African partnerships in clinical trials with more than 100,000 African patients (for therapeutic trials) and healthy volunteers (for vaccine trials).

31 trials on HIV/AIDS, 25 trials on TB, 32 trials on malaria

Many of the clinical trials supported by EDCTP1 address the improvement and adaptation of existing medical interventions and drug treatments to specific, vulnerable target groups, such as malnourished children or pregnant women. These trials were launched in accordance with standards on good clinical practice as formulated by International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH). Although some clinical trials are still ongoing, initial positive outcomes have been achieved:

- **The Kesho Bora study** of highly active anti-retroviral therapy during pregnancy and breastfeeding demonstrated a 43% reduction in HIV infections in infants and more than 50% reduction of mother-to-child transmission during breastfeeding. The findings were presented at the 5th International Aids Society Conference in 2009 and informed the new 2010 WHO guidelines on prevention of mother-to-child transmission of HIV.
- **The 4ABC study** conducted at twelve trial centres in seven sub-Saharan African countries (Burkina Faso, Gabon, Mozambique, Nigeria, Rwanda, Uganda, and Zambia). More than 10,000 children between 6 and 59 months old were screened and a total of 4,116 children were included in the study and treated. Three novel artemisinin-based combination drugs were found to be safe and efficacious in treating children with uncomplicated malaria. The study informed African health ministries on the relative safety and efficacy of available artemisinin-based combination therapies, and its results supported the WHO recommendation of dihydroartemisinin-piperaquine (DHAPQ) as a treatment option for uncomplicated malaria.
- **REMoXTB** addresses the rapid evaluation of moxifloxacin in the treatment of sputum smear positive tuberculosis. This study is part of the PanACEA consortium and is evaluating moxifloxacin as a treatment shortening regimen for treatment of tuberculosis. Enrolment was completed in January 2012 and patients are being followed up for 18 months. If the results are positive, the product developers—TB Alliance and the pharmaceutical company Bayer — will seek registration of moxifloxacin as part of a multi-drug regimen for drug-sensitive tuberculosis. This project has made a major contribution to building capacity for regulatory standard clinical trial sites in Africa. If found non-inferior, this regimen will significantly shorten the treatment period of drug-sensitive tuberculosis.
- **The Severe Malaria in Children (SMAC) network** demonstrated that three doses of iv artesunate over two days is as effective as the five doses over a three day regimen, thereby contributing to the development of a lower cost regimen with the potential to reduce the risk of complications and incomplete treatment. A phase III follow-up clinical study completed enrolment of a total of 1,046 children with severe malaria, and aims to further optimise the drug administration in the treatment of patients.
- **The CHAPAS trial** contributed to the FDA approval in February 2009 and WHO prequalification of Triomune Baby/Junior, a fixed-drug combination formulation for the treatment of HIV in children.
- **The Europe-Africa Research Network for Evaluation of Second Line Therapy (EARNEST)** resulted in a feasible second-line therapy for HIV patients in Africa.

Sources: *EDCTP annual reports*

EDCTP is widely recognised as having produced important results, such as the establishment of African Networks of Excellence for clinical trials in Africa, the creation of new national ethics committees in many African countries, or the testing of an antiretroviral formulation for HIV infected children in Africa, which has been approved by the US FDA (European Commission, 2011). A recent bibliometric study of EDCTP scientific productivity in the period 2003-2011 shows that research output arising from European-sub-Saharan African country collaboration has doubled since 2003 (Bruegelmans, et al., 2015). An assessment of the impact of the EDCTP1 aggregates the impact to be spread across three domains: clinical trials, capacity building in sub-Saharan Africa and, networking and research coordination.

6.3 Success factors

At least half of the interviewees contacted for this study identified the EDCTP as the most notable and successful initiative with Africa-EU health R&I cooperation. Most attributed its success and outcomes to a number of factors.

- **Long-term approach:** The timeframe and scale of the EDCTP is a significant success factor. The initiative has been in operation for ten years, unlike many other initiatives of Africa-EU health cooperation that have relatively short time frames, often three years or so. Related to the timeframe, the quantum of funding for EDCTP is also relatively high.
- **Partnership composition:** Because of its strong partnership structure, many African partners feel they have adequate ownership or shareholding in EDCTP, and thus they tend to make various forms of direct financial and in-kind contributions to the initiative.
- **Clear role for private sector:** Increasing private sector engagement in EDCTP projects has contributed to the growing potential of the initiative to generate tangible products with specific patents.

6.4 Launch of EDCTP2

Recognising its success, the EU has decided to extend its commitment to the initiative and increase its contribution from EUR 200 million to EUR 683 million for EDCTP2 (2014-2023) as part of the Societal Challenges, Health Demographic Change and Wellbeing, thematic funding area of Horizon 2020.[23] Participating EU states are expected to contribute an equivalent amount of EUR 683 million and an additional EUR 500 million is expected to be contributed by African countries. Third parties such as private sector actors, PDPs, and international development actors are also expected to be included in the activities of EDCTP2, making it a novel and productive public-public partnership between countries in sub-Saharan Africa and Europe.

[23] *http://ec.europa.eu/research/consultations/edctp/edctp_public_consultation_results.pdf*

7

DISCUSSION: BARRIERS TO COOPERATION AND SOME SUGGESTED SOLUTIONS

Cooperation between Africa and Europe in health R&I has grown and deepened as a result of regional integration and globalisation. Bilateral, bi-regional and multilateral cooperation activities on health R&I have increased in recent decades, as has the productivity of joint Africa-EU scientific research projects. However, several issues hamper the progress that has been made.

This report identifies key challenge areas and proposes solutions for strengthening the cooperation. In brief, these solutions encompass the need to:

- improve the overall policy conditions for health R&I in Africa;
- establish clear mechanisms for ensuring that African governments make financial contributions to Africa-EU health R&I activities;
- ensure that the private sector's engagement is strengthened by inviting companies to engage in the design of health R&I projects at an early stage;
- integrate innovation more explicitly within collaborative research projects; and,
- adopt a long-term investment approach to health R&I.

7.1 Barrier: Financing of health R&I is one-sided, policy declarations not backed by African co-investment

As shown in this report, Africa-EU health R&I cooperation is guided by a range of explicit and implicit policies, expressed in the declarations of AU summits, the Africa Health Strategy, the JAES, and guidelines of the EU's framework programmes. This paper shows that EU policy instruments, including the JAES, have so far delivered tangible health R&I outcomes through projects funded by FP6, FP7 and the ACPS&T programme. These EU investments, however, are not adequately complemented by African resources. In large part the health R&I-related policy statements in AU summit declarations and within the Africa Health Strategy remain statements of intent since they are not backed up by investments from African governments.

Box 3: Strengthening bi-regional health R&I priority setting

There is a clear need to establish platforms and processes for priority setting in Africa-EU health R&I cooperation. CAAST-Net Plus partners could support the EU-Africa HLPD on STI to conduct a joint health R&D priority setting exercise to align bi-regional priorities to European and African health research strategies.

Example: The case of non-communicable diseases

The increasing burden of non-communicable diseases, for example, in Africa should no longer be a "health iceberg hidden under epidemics of infectious diseases" (Naghavi & Forouzanfar, 2013, p. 95). Indeed, non-communicable diseases (NCDs), such as cancer, diabetes or mental health, require as much attention as infectious diseases. In Africa the social and economic burden of these pathologies is heavy and it might soon be higher than the burden of infectious diseases. Compounding the problem is that African institutions hardly participate in research on NCDS.

CAAST-Net Plus partners conducted a bibliometric study on health publications of research collaboration between Africa and Europe spanning the last decade. The study clearly shows that NDC were absolutely not a research priority as measured by co-publications. In addition, the number of publications on Poverty Related Diseases (PRD) is growing much quicker, than on NCD. Fortunately, since 2012 there is a identifiable increase on joint NCD publications.

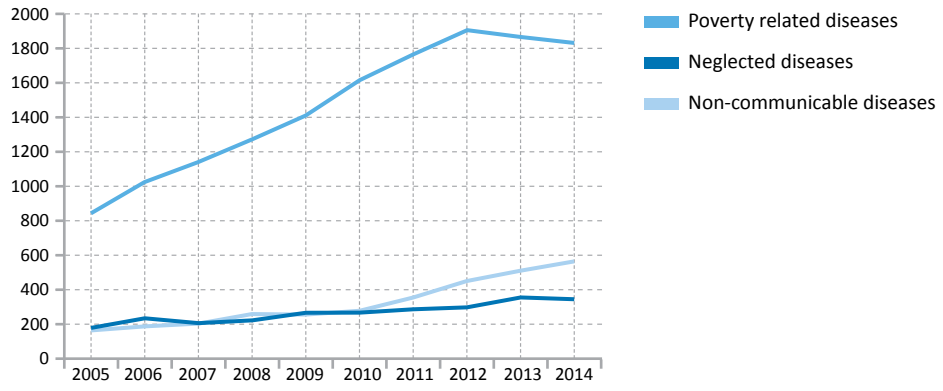

Figure 3: EU-Africa co-publications 2005-2014 in the selected strands of health research.
***Source:** I. Wagner, Centre for Social Innovation, Austria (August 2015)*

Solution: Increase dialogue on African financial mechanisms for health R&I

There is a need for African partners to start exploring financing regional and bi-regional health R&I. Initiatives such as the EDCTP, AESA or ERAfrica which are based on joint ownership and funding should be supported by governments in Europe and Africa.

7.2 Barrier: Lack of opportunities for private sector engagement

The private sector writ large is a major player in Africa-EU health R&I cooperation and its participation in cooperation has increased over the past decade. Stimulated by various policy and programmatic initiatives, such as Horizon 2020, we anticipate this growth to continue. However, *African* private sector participation within the cooperation landscape will be constrained unless African countries design clear strategies for promoting the sector's engagement in bi-regional R&I initiatives.

Solution: Strengthening private sector and SME participation in joint health R&I

African and European partners should explore the possibilities of supporting African entrepreneurs to produce healthcare research. A stronger involvement of the private sector in healthcare would build the capacities of African SMEs to grow into health research-performing SMEs. Increased private sector engagement in Africa-EU health R&I cooperation could be achieved if a range of policy issues are addressed. These include developing clear and evidence-based intellectual property protection policies and laws, strengthening the quality of the institutional infrastructure for regulating health R&I in general and clinical trials in particular, and creating fiscal or economic incentives for private companies to invest in health R&I. National governments should improve the policy conditions for private sector engagement. A survey of research-performing SMEs, case studies on the impact of IPR on private sector engagement, R&D incentives, and socio-economic issues related to clinical trials are all issues to be more deeply explored.

There is also a need for debate and dialogue among AU and EU partners to explore the possibilities of establishing a programme for research-performing SMEs in Africa. One model example is the European programme Eurostars, which is a joint programme between EUREKA and the European Commission, co-funded from the national budgets of 34 Eurostars Participating States and Partner Countries and by the European Union through Horizon 2020. In the 2014-2020 period it has a total public budget of €1.14 billion. The programme supports international innovative projects led by research and development-performing SMEs.[24]

[24] https://www.eurostars-eureka.eu/

7.3 Barrier: Conditions for health research and innovation need to be improved

Bi-regional health R&I cooperation has the potential to influence national and international policymaking. However, the challenges of international collaborations are numerous. Strengthening institutional R&I capacities of African countries should be a minimum requirement in bi-regional cooperation.

Solution: COHRED Research Fairness Initiative

The COHRED Research Fairness Initiative (RFI) is an emerging platform that promises to address several challenging framework conditions around health research partnerships through promotion and validation of responsible/fair practices in international collaborative health R&I. In order to improve research conditions and outcomes, policy innovations are needed by research institutions to ensure access to knowledge, data and technology, and support for the translation of results into products or policies. By improving career perspectives, enhancing mobility, and reducing bureaucracy research managers can create enabling environments for partnerships to develop. *http://rfi.cohred.org*

7.4 Insufficient policy uptake

In addition to its use for technological innovation, science is important for and in public policymaking. The EU has placed emphasis on supporting activities that strengthen science-policy linkages and scientific research projects that have explicit goals of contributing to the improvement of the quality of health public policies. For example, FP6 and FP7 had several projects on science-for-policy. The EDCTP for example has explicit goals to use scientific research to directly influence policies and regulations for clinical trials and approval of medicines. However, many of the bi-regional health R&I cooperation projects analysed in this study do not have explicit goals of influencing policy and have no strategies for ensuring the uptake of science into policymaking. Of course not all R&I initiatives *must* have policy level uptake, for example, if they work on capacity building and have no policy relevant outcomes. Still, there are many EU-funded bi-regional health R&I projects that have policy relevant outcomes but which are unknown to policymakers. In these cases researchers and project managers have to develop strategies to use science to influence policies.

Some of the project managers and policymakers we engaged with in this research identified the following barriers to science-policy interfaces:

- There are few bi-regional health R&I initiatives in which policymakers have been involved in their design and governance. In many cases African policymakers are not fully aware of the EU-funded health research activities in their countries.
- Researchers in most bi-regional health R&I initiatives do not have adequate skills for policy analysis and advocacy, and many initiatives do not have explicit policy outreach strategies.
- Most African researchers are not adequately informed or aware of key AU and EU policy processes, such those relating to the JAES and Africa Health Strategy.

Solution: Enhance the use of research results to influence and improve policy

The use of scientific evidence in decision making has tremendous potential to effect meaningful policy change for the benefit of citizens and for development writ large. Policymakers in Africa and Europe are increasingly confronted by emerging public health issues, in which they share the responsibility and pressure to act impartially and effectively in the public interest. Scientific research has an important role to play in this regard. Even though bi-regional health research project generate a substantial number of outputs, particularly publications, the translation of knowledge into products or policies can be enhanced through better communication. Research institutes should partner with media and policy research agencies to disseminate information on research findings. Reciprocal communication between governments and research institutes needs documentation, especially if research activities influence public policies in Africa and the EU.

8

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APPENDICES

Appendix A: Health cooperation references in the JAES

Para 8(iii) Objective 3 of the JAES	*To jointly promote and sustain a system of effective multilateralism, with strong, representative and legitimate institutions, and the reform of the United Nations (UN) system and of other key international institutions, and to address global challenges and common concerns such as human rights, including children's rights and gender equality, fair trade, migration, HIV/AIDS, malaria, tuberculosis and other pandemics, climate change, energy security and sustainability, terrorism, the proliferation of Weapons of Mass Destruction and the illicit trafficking of Small Arms and Light Weapons, and knowledge-based society issues such as ICT, science, technology and innovation.*
Para 44	*One key area will be regulations and technical standards, including sanitary and phytosanitary (SPS) measures. It is widely recognised that meeting international SPS standards is a key component for advancing the competitiveness and market access of African agriculture and food processing industry. Improving African standards will therefore enable greater access to international markets, the promotion of South-South trade and the diminution of non-tariff barriers to trade. Both sides will continue to promote market access for African goods and services to international markets, in particular the EU market. Another key area will be enhancing pharmaceutical production capacities in accordance with international rules on good manufacturing practices (GMPs) and efficient regulatory procedures, including the control of counterfeit medicines and of other products, while promoting access to affordable essential generic medicines, vaccines and commodities for major prevailing diseases and epidemics. In this regard, the capacity of African countries to make full use of flexibilities in TRIPs, in line with the Pharmaceutical Manufacturing Plan for Africa, will be developed. A third key area will be preferential market access for environmentally friendly technologies and products.*
Para 49	*For the Millennium Development Goals (MDGs) to be achieved, African countries need to sustain economic growth and equitable social development, and both Africa and the EU have to boost their investments, better focus their policies and deliver on the promises made. Mid-way between 2000 and 2015, supporting Africa's efforts to achieve the MDGs remains the key challenge for the EU's external and development cooperation policy vis-à-vis the continent. In this regard, efforts should focus on making a key contribution to the achievement of the 8 MDGs on (1) poverty and hunger, (2) universal primary education, (3) gender equality and empowerment of women, (4) child mortality, (5) maternal health, (6) HIV/AIDS, malaria and other diseases, (7) environmental sustainability, and (8) the development of a partnership for development.*
Para 60	*In the field of health, integrated strategies, including the strengthening of national health systems at all levels, will be promoted by Africa and the EU, based on adequate financing, human resources and commodities. To reinforce health system capacity, partners will also jointly address both the migration of health workers, which is a crisis in some African countries, and the creation or reinforcement of social protection systems. Efforts will be made in line with the Africa Health Strategy, the EU Project on Human Resources for Health, the Abuja commitment (15% financing for health) and the European Programme for Action to Tackle the Shortage of Health Workers in Developing Countries. Efforts to scale up towards universal access to basic health services, HIV/AIDS, Tuberculosis Malaria prevention, treatment, care and support by 2010, and cooperation on other pandemics as well as on issues relating to meningitis, will be intensified, with special focus on women, children and adolescents, older and disabled persons as well as members of vulnerable groups.*

Para 61	*The involvement of the private sector in health sector development and financing, including through public-private partnerships, should be encouraged and the production and access to generic medicines should be enhanced. Africa and the EU will, in addition, promote further research, particularly for vaccines and new medicines for both major and neglected diseases, and on issues relating to water-borne diseases, as well as on the clinical effectiveness of traditional medicine. Partners will also work towards effective implementation of international health agreements and regulations.*
Para 62	*Sexual and Reproductive Health and Rights (SRHR) will be promoted with the aim of achieving universal access to reproductive health by 2015 and to reduce newborn, infant and maternal morbidity and mortality, as set out by the International Conference on Population and Development (ICPD) and the Maputo Plan of Action, in the context of the Action Plans of this Joint Strategy.*

Source: *Joint Africa-EU Strategy*

Appendix B: Policy statements on health R&I in the Africa health strategy 2007-2015

Para 87	*Health Research provides the evidence for policy- and decision-makers at all levels to make efficient and effective decisions. This was reinforced and detailed direction on Health Research provided in the reports of the Abuja and Accra High Level Ministerial Meetings on Health Research. The content of research is critical and needs to go beyond determining prevalence to explore what social and psychological factors are behind health choices, and what factors lead to success of interventions. A continental position paper on health research in Africa should be developed.*
Para 88	*African countries should build research capacity and allocate at least 2% of national health expenditure and 5% of project and programme aid for research. They should prepare legislation governing research and establish or strengthen national health research systems and establish platforms for research to be presented so that it can indeed influence health policy and practice.*
Para 89	*Multi-country collaborations will help to determine whether factors are specific to a country or locality or are broader predictors and determinants for a region or the continent. Countries should share their research findings among themselves and with the AU Commission. Clinical trials and research by international organisations should be regulated and be ethical.*

Source: *Africa Health Strategy 2007-2015*

Appendix C: List of FP6 Africa-EU health cooperation projects

ACRONYM	PROJECT/PROGRAMME TITLE
CAPABILITY	Capacity Building for the Transfer of Genetic Knowledge into Practice and Prevention: An International Collaborative Network
NEBRA	Networking for Ethics on Biomedical Research in Africa
PROMISE COMPONENT- 2	Promoting Infant Health and Nutrition in Sub-Saharan Africa: Safety and Efficacy of Exclusive Breastfeeding Promotion in the Era of HIV
TRYLEIDIAG	Simplified and Rapid Molecular Assays for Diagnosis of Leishmaniasis and Human African Trypanosomiasis and Parasite (sub-) Species Identification
BURULICO	Buruli Ulcer: Multidisciplinary Research for Improvement of Control in Africa
HATCAP	Support for Clinical Trial Capacity Platform for Sleeping Sickness in Africa
SODISWATER	Solar Disinfection as an Appropriate Household Water Treatment and Storage (HWTS) Intervention Against Childhood Diarrhoeal Disease in Developing Countries or Emergency Situations
TFCASS	Tsetse Flies and the Control of African Sleeping Sickness
ARVMAC	Effects of Antiretrovirals for HIV on African Health Systems, Maternal and Child Health
SUPPORT	The Support Collaboration: Supporting Policy Relevant Reviews and Trails
VHF Diagnostics	Development of Rapid Field Diagnostics for Identification, Control and Management of Haemorrhagic Fever Outbreaks
CONTRAST	A Multidisciplinary Alliance to Optimize Schistosomiasis Control and Transmission Surveillance in Sub-Saharan Africa
SHIELD	Strategies for Health Insurance Mechanisms to Address Health System Inequities in Ghana, South Africa and Tanzania
SCOOTT	Sustainable Control of Onchocerciasis Today and Tomorrow
NEUROTRYP	Biology and Clinical Staging of Trypanosome Neuroinvasion in Sleeping Sickness
AUDOBEM-AFRO	Effectiveness of Facility-Based Audits to Improve the Responsiveness of West African District Hospitals to Obstetric Emergencies: A Three-Country Cluster Randomised Controlled Trial

ACRONYM	PROJECT/PROGRAMME TITLE
GHIS IN AFRICA	Experience of African Countries with Global Health Initiatives
SCHISTOINIR	Innate Immune Responses and Immunoregulation in Schistosomiasis: Novel Mechanisms in The Control of Infection and Disease
TRANCHI	T cell Regulation and the Control of Helminth Infections
PILDU	Emergency Contraception: A Means to Improve Reproductive Health in West Africa?
FAHOPHS	Addressing the Health of Children in Urban Poor Areas Through Improved Home-Based Care, Personal Hygiene and Environmental Sanitation And Healthcare Services
REACT	Strengthening Fairness and Accountability in Priority Setting for Improving Equity and Access to Quality Healthcare at District Level in Tanzania, Kenya and Zambia
MUSTSCHISTUKEMA	Multi-Disciplinary Studies of Human Schistosomiasis in Uganda, Kenya and Mali: New Perspectives on Morbidity, Immunity, Treatment and Control

Appendix D: Overview of EC financial contribution to FP6 health cooperation initiatives

PROJECT/PROGRAMME ACRONYM	TOTAL PROGRAMME/PROJECT BUDGET (EUR)	EC CONTRIBUTION (EUR)
CAPABILITY	€499 996	€499 996
NEBRA	€380 000	€380 000
PROMISE COMPONENT- 2	€1 340 000	€1 340 000
TRYLEIDIAG	€3 725 455	€2 390 000
BURULICO	€1 590 000	€1 590 000
HATCAP	€550 200	€340 000
SODISWATER	€2 542 739	€1 900 000
TFCASS	€3 091 015	€2 500 000
ARVMAC	€2 673 926	€2 400 000
SUPPORT	€1 199 998	€1 199 998
VHF Diagnostics	€914 380	€853 000
SHIELD	€2 233 705	€1 999 443
SCOOTT	€3 224 884	€2 800 000
NEUROTRYP	€1 700 000	€1 700 000
AUDOBEM-AFRO	€2 999 979	€2 999 979
GHIS IN AFRICA	€3 199 531	€3 199 531
SCHISTOINIR	€1 999 312	€1 999 312
TRANCHI	€2 190 000	€1 950 000
PILDU	€2 688 000	€2 348 000
FAHOPHS	€150 000	€150 000
REACT	€1 770 000	€1 770 000
MUSTSCHISTUKEMA	€1 500 000	€1 500 000
CONTRAST	€3 446 987	€2 900 000

Appendix E: List of FP7 health cooperation projects involving African partners

	PROJECT TITLE
1.	Accessing Medicines in Africa and South Asia (AMASA)
2.	Enabling Universal and Equitable Access to Healthcare for Vulnerable People in Poor Resource Settings (EQUITABLE)
3.	Health, Environmental Change and Adaptive Capacity; Mapping, Examining and Anticipating Future Risks of Water-Related Vector-Borne Diseases in Eastern Africa (HEALTHY FUTURES)
4.	Health Education and Community Integration: Evidence-Based Strategies to Increase Equity, Integration and Effectiveness of Reproductive Health Services for Poor Communities in Sub-Saharan Africa (Inthec)
5.	INDEPTH Training and Research Centres of Excellence (INTREC)
6.	Quality of Prenatal and Maternal Care (QUALMAT)
7.	Diagonal Interventions to Fast-Forward Enhanced Reproductive Health (DIFFER)
8.	Genome-Driven Vaccine Development for Bacterial Infections (GENDRIVAX)
9.	Developing And Testing of New Methodologies to Monitor and Evaluate Health Related EU-Funded Interventions in Cooperation Partner Countries (EVAL-HEALTH)
10.	Building Sustainable Research Capacity for Health and its Social Determinants in Low- and Middle-Income Countries (SDH-Net)
11.	Access to Pharmaceuticals (ATP)
12.	Universal Coverage in Tanzania and South Africa: Monitoring and Evaluating Progress (UNITAS)
13.	Enhanced Protective Immunity Against Filariasis (E Piaf)
14.	Supporting the Use of Research Evidence for Policy in African Health Systems (SURE)
15.	Targeting HIV Integration Co-Factors, Targeting Cellular Proteins During Nuclear Import or Integration Of HIV (THINC)
16.	Identification and Development of Vaccine Candidates for Buruli Ulcer Disease (BURULIVAC)
17.	Nurse Forecasting: Human Resources Planning in Nursing (RN4CAST)
18.	Collaborative HIV and Anti-HIV Drug Resistance Network (CHAIN)
19.	Socially Inclusive Health Care Financing in West Africa and India (HEALTH INC)
20.	Reaching Out and Linking In: Health Systems and Close-To-Community Services (REACHOUT)
21.	Care Package for Treatment and Control of Visceral Leishmaniasis in East Africa (AFRICOLEISH)
22.	Assessing the Impact of Fee Exemption on Maternal Health in West Africa and Morocco: New Tools, New Knowledge (FEMHEALTH)
23.	Community-Based Scheduled Screening and Treatment of Malaria in Pregnancy for Improved Maternal and Infant Health: A Cluster-Randomized Trial (COSMIC)

	PROJECT TITLE
24.	Host and Microbial Molecular Dissection of Pathogenesis and Immunity in Tuberculosis (HOMITB)
25.	Coordination Action for Reinforcing the Health National Contact Points Network (HEALTH-NCP-NET)
26.	Promoting Sexual and Reproductive Health Among Adolescents in Southern and Eastern Africa Mobilising Parents, Schools, and Communities (PREPARE)
27.	Formulating New Goals for Global Health, and Proposing New Governance for Global Health that will Allow the Achievement Of These Goals (GO4HEALTH)
28.	More Medicines for Tuberculosis (MM4TB)
29.	Sustaining Research Momentum Over the Coming Decades: Mentoring the Next Generation of Researchers for Tuberculosis (TBSUSGENT)
30.	European Network for Global Cooperation in the Field of AIDS & TB (EUCO-NET)

Appendix F: List of FP7 Africa Call EC-funded health projects

PROJECT TITLE	THEME (GENERAL OR HEALTH R&I)	EUR
Human Resources for Primary Health Care in Africa (HURAPRIM)	General health (health systems strengthening)	€2 998 725
Clinical Officer Surgical Training in Africa (COST-Africa)	General health (health systems strengthening)	€2 997 027
Improving Health Workforce Performance (PERFORM)	General health (health systems strengthening)	€2 995 324
Missed Opportunities in Maternal and Infant Health (MOMI)	General health (health systems strengthening)	€2 997 647
Enhancing Human Resources and Use of Appropriate Technologies for Maternal and Perinatal Survival in Sub-Saharan Africa (ETATMBA)	General health (health systems strengthening)	€2 599957
Expanded Quality Management Using Information Power on Maternal and Newborn Health in Africa (EQUIP)	General health (health systems strengthening)	€2 998 406
African Regional Capacity Development for Health Systems and Services Research (ARCADE HSSR)		€1 978 424
Consortium for Health Policy and Systems Analysis in Africa (CHEPSAA)	General health (Health policy and systems strengthening)	€1 999 956
Multi-disciplinary University Traditional Health Initiative (MUTHI)	Biotechnology infrastructure development	€1 991 983
Building Research Capacity of Blood Transfusion Services in Africa (T-REC)	Biotechnology infrastructure development	€1 698 368
Building a Research and Education Infrastructure for Africa (BUILD AFRICA)	Infrastructure	€1 999 494
African Vector Control: New Tools (AvecNet)	Health R&I (Biotechnology research)	€11 999 989
HPV in Africa Research Partnership (HARP)	Health R&I (Genetic tests/Genomics)	€3 000 000
Prevention of Liver Fibrosis and Cancer in Africa (PROLIFICA)	Health R&I (Genomics)	€3 000 000
APARET (African Programme for Advanced Research Epidemiology Training)	General health (health systems strengthening)	€1 988 346

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