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Science and Innovation in Africa: International Funding and Cooperation



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Editorial

Dear readers,

Africa is an emerging continent with high potential. There are opportunities for further development in many sectors. The 12th special issue of the *ITB infoservice* on “Science and Innovation in Africa: International Funding and Cooperation” opens up this broad field thematically and geographically. While the focus is on Sub-Saharan Africa, we have included North African countries wherever they are involved in pan-African initiatives. As always, a range of guest authors have contributed their expert knowledge to creating this issue.

The introductory chapter examines the evolution of research and innovation in Africa so far as well as international, European and German development and cooperation strategies. In the subsequent first section, our authors present different national funding approaches from Norway, Switzerland, China, France and Germany. Another article puts the spotlight on the South African National Research Foundation (NRF), which maintains numerous bi- and multilateral partnerships.

The second section showcases a number of initiatives that aim to establish cross-country research institutes, universities and academies with a view to creating networks and mutual support structures. African universities are, e.g., working towards the improvement of technical studies and the further education of specialists for vocational training. Part of the dynamic development of Africa is the establishment of a new African funding platform which is taking over the management of major funding programmes from foundations such as, e.g., the Wellcome Trust.

In the final section, we present European and German funding initiatives which are setting up cross-country cooperations in Africa in order to tackle global challenges such as climate change, food security and health on site.

As you will have noticed, we have completely redesigned this publications series to reflect the new layout of our relaunched website *Kooperation International*. Another new feature are German summaries that preface the English articles.

Yours sincerely,
Sonja Bugdahn and Andreas Ratajczak



Expert Contacts DLR Project Management Agency

Dr Stefan Wagener
European and International Cooperation
Head of Division Africa, Middle East, Turkey
+49 228 3821-1825, stefan.wagener@dlr.de

Dr Detlef Böcking
Health
Coordination Global Health
+49 228/3821-1118, detlef.boecking@dlr.de

Dr-Ing Olaf Pollmann, PhD in Environmental Sciences
Environment and Sustainability
Climate Competence Centers in Africa
WASCAL and SASSCAL
+49 228/3821-1535, olaf.pollmann@dlr.de

Further Information on Expert Contacts for specific African countries can be found on the Websites of the International Bureau

for Sub-Saharan Africa
► http://www.internationales-buero.de/en/contacts_subsaharan_africa.php

for North Africa and the Middle East
► http://www.internationales-buero.de/en/contacts_north_africa_middle_east.php

Liebe Leserinnen und Leser,

Afrika ist ein aufstrebender Kontinent mit hohem Potenzial. Gleichzeitig gibt es einen enormen Aufholbedarf in vielen Bereichen. Die 12. Schwerpunktausgabe des *ITB infoservice* zu „Wissenschaft und Innovation in Afrika: Internationale Förderung und Kooperation“ eröffnet thematisch und geografisch dieses weite Feld. Den Fokus legen wir dabei auf Subsahara-Afrika, beziehen nordafrikanische Länder jedoch mit ein, soweit diese sich an panafrikanischen Initiativen beteiligen. Bei der Erstellung der Inhalte haben uns wie immer zahlreiche Gastautorinnen und -autoren mit ihrer Expertise unterstützt.

Das Einführungskapitel beleuchtet die bisherige Entwicklung von Forschung und Innovation in Afrika sowie internationale, europäische und deutsche Strategien zur Förderung und Kooperation. Im nachfolgenden ersten Abschnitt stellen unsere Autorinnen und Autoren verschiedene nationale Förderansätze aus Norwegen, Schweiz, China, Frankreich und Deutschland vor. Ein weiterer Beitrag konzentriert sich auf die südafrikanische National Research Foundation (NRF), die weltweit eine Vielzahl von bi- und multilateralen Partnerschaften pflegt.

Der zweite Abschnitt geht auf eine Reihe von Initiativen ein, die darauf abzielen, länderübergreifend Forschungsinstitute, Hochschulen und Akademien aufzubauen und zu vernetzen sowie sich gegenseitig zu unterstützen. So arbeiten afrikanische Hochschulen daran, technische Studien oder die Weiterbildung von Fachkräften für berufliche Ausbildung zu verbessern. Zur dynamischen Entwicklung in Afrika gehört auch die Gründung einer neuen afrikanischen Förderplattform, an die Stiftungen, wie zum Beispiel der Wellcome Trust, das Management großer Förderprogramme übertragen haben.

Abschließend werden europäische und deutsche Förderinitiativen beschrieben, die in Afrika länderübergreifende Kooperationen aufbauen, um vor Ort globale Herausforderungen wie Klimawandel, Ernährungssicherheit und Gesundheit zu bewältigen.

Wie Sie sehen, haben wir die Publikationsreihe optisch völlig überarbeitet. Das Design orientiert sich

an dem ebenfalls neugestalteten Internetauftritt von *Kooperation international*. Eine weitere Neuerung ist, dass jedem der durchgehend englischsprachigen Beiträge eine deutsche Zusammenfassung vorangestellt wird.

Ihre Sonja Bugdahn und Andreas Ratajczak



Fachliche Ansprechpartner im DLR Projektträger

Dr. Stefan Wagener
Europäische und Internationale Zusammenarbeit
Leiter der Abteilung Afrika, Nahost, Türkei
0228 3821-1825, stefan.wagener@dlr.de

Dr. Detlef Böcking
Gesundheit
Koordination Globale Gesundheit
0228/3821-1118, detlef.boecking@dlr.de

Dr.-Ing. Olaf Pollmann, PhD in Environmental
Sciences
Umwelt und Nachhaltigkeit
Klimakompetenzzentren in Afrika
WASCAL und SASSCAL
0228/3821-1535, olaf.pollmann@dlr.de

Fachliche Ansprechpartner für Subsahara-Afrika
► http://www.internationales-buero.de/en/contacts_subsaharan_africa.php

Fachliche Ansprechpartner für Nordafrika und
Mittlerer Osten
► http://www.internationales-buero.de/en/contacts_north_africa_middle_east.php



Ausführliche Länderinformationen bei Kooperation international

Länderübersicht Afrika
► <http://www.kooperation-international.de/laender/afrika/>

Introduction

Current Trends and Developments in African Science and Innovation

Deutsche Zusammenfassung

Der afrikanische Kontinent bleibt im Wandel. Neben enormen natürlichen Ressourcen gibt es eine wachsende Mittelschicht, steigende Zahlen junger Menschen mit Unternehmergeist, jedoch weiterhin auch den Mangel an Märkten, Arbeitsplätzen und qualifiziertem Personal. Um zur gesellschaftlichen Entwicklung auf diesem Kontinent beizutragen und Themen wie Gesundheitsversorgung, Nahrungsmittelsicherheit und Energieversorgung anzugehen, sind neben anderen auch Wissenschaft, Technologieentwicklung und Innovation zentrale Faktoren. Mit ihrer Hilfe entstehen neue Produkte und Märkte, die ihrerseits Perspektiven schaffen und den gesellschaftlichen Aufbau unterstützen. Forschung und Bildung sind Treiber für Wissenschaft, Technologie und Innovation. Die Strategien der Afrikanischen Union (Agenda 2063, STISA 2024) greifen diese Gedanken auf. In diesem Wissen gewinnt die Kooperation in Bildung und Forschung zwischen afrikanischen und ihren weltweiten Partnern, wie z. B. Deutschland, den Charakter einer echten Partnerschaft auf der Basis von langfristigen Zielen. Staaten wie Südafrika profitieren bereits von ihrer längerfristigen Investition in Bildung und Forschung. Auch zeigt sich, dass afrikanische Regierungen anteilig zur Finanzierung von Gemeinschaftsprojekten beitragen können. Ein Beispiel ist die gemeinsame Afrika-EU-Strategie (JAES), unter der europäische und afrikanische Staaten aktuell gemeinsam Forschungsvorhaben zu Nahrungsmittelsicherheit finanzieren.

A rising number of young, well-educated people full of innovative ideas and strong entrepreneurial spirit, a growing middle class, and vast supplies of natural resources, which represent an immense value for national and international economies, should guarantee an excellent starting point for the advancement of stability and prosperity in Africa. Yet social and economic developments depend on multiple, often closely interrelated factors.

To build a fair and bright future for all, it is essential to finally recognise Science, Technology and Innovation (STI) as a key driver for inclusive growth. In this context, research and education are crucial in tackling mutual challenges, such as climate and environmental change, health provision, and food security. Research drives STI, and STI is central to translating scientific knowledge and technological know-how into useful products, services and employment. STI can create a social and economic environment that fosters the production of goods and services as well as a stable labour market with accessible jobs, and which addresses local and regional needs and

challenges. By providing opportunities for young and aspiring people, STI reduces root causes for migration and flight and thus helps to stabilise societies and countries.

One big obstacle to innovation in many African countries is a lack of skilled labour. Improvements in the quality of education – primary up to tertiary –, apprenticeships, and skill-building trainings on the job are needed to strengthen human resources. Investing in education and research therefore helps to advance national innovation systems. The rise of China and India, for example, to global players can be regarded as proof that investment in education and research, particularly in technology fields, is imperative to economic evolution, although other factors, such as market availability, also come into play.

In the belief that Africa's competitiveness, its economic transformation and sustained growth require a continuous investment in new technologies and innovation, the African Union (AU) has developed its *Agenda 2063* and the *Science, Technology and Innovation (STI) Strategy for Africa (STISA-2024)*.

STI is highlighted as one of the major drivers for reaching the development goals of the AU Member States. Agriculture, clean energy, education, health and bio-sciences are identified as primary areas of activity.

It goes without saying that Africa has seen major changes in recent decades. Some countries, like South Africa, have developed into a beacon of innovation on the continent and beyond. Other countries have the same potential, but for various reasons are still not in a position to benefit from it. To proceed further along this path, African countries seek international partners who support them in a positive evolution, driven by their own capacities and abilities. There is an increasing number of true partnerships with mutual benefits, in which cooperation activities are moving away from the donor-recipient relationships of the past. While international funding still constitutes a significant share of the total research, education, and development funds deployed in Africa, the monetary contributions from African countries to joint activities with partners from the continent itself and from around the world are rising. Mutual challenges in the areas of food security, sustainable agriculture and energy provision, education and health are tackled in cooperation, with joint financing.

On a global scale, the *G20 Africa Partnership* emphasised the importance to a) improve inclusive economic growth and employment, to b) develop quality infrastructure especially in the energy sector; and to c) strengthen the framework for private finance and investment in Africa (*Compact with Africa*) in June 2017. Leaders from African, G20 and other partner countries together with private sector investors set priorities for future joint approaches to the different facets of innovation in the context of societal and economic development. Support for research and development as a means to driving innovation was reaffirmed by G7 and G20 when global health as a topic and an area of intense research was put on the agenda. Globe-spanning initiatives like the *Global Research Collaboration for Infectious Disease Preparedness* (GLOPID-R) and the *Coalition for Epidemic Preparedness Innovations* (CEPI) have been joined by ministries and research funders from around the world, including Africa.

The *Joint Africa-Europe-Strategy* (JAES) on Science, Technology and Innovation launched partnerships on *Food and Nutrition Security and Sustainable Agriculture* (FNSSA) as well as on *Climate Change and Sustainable Energy* (CCSE). The two partnerships and their thematic priorities were adopted by the African Union Commission (AUC) and the European Commission in April 2016 and October 2017, respectively. Both contribute to the aforementioned priorities with activities in research, education and capacity building. In close communication and cooperation, the stakeholders involved, namely African and European national governments, NGOs, and private sector parties, aim to tackle mutual challenges by joining forces, pooling finances and avoiding duplicate efforts. Joint multilateral funding under the JAES is taking place in the above mentioned priority areas, like FNSSA, and is planned for the CCSE priority as well. European and African governments and organisations are pooling dedicated funds for research and innovation activities in these areas.

The importance of leveraging international resources for the implementation of STI measures and policies that support effective partnerships between African countries and their partners cannot be over-emphasised. In recent decades, new ways of strategic thinking and funding have been entering international cooperation with Africa. The approach now taken by individual countries in drafting national strategies for their Africa STI engagement is more holistic and cooperative. Partnerships on equal footing continue to replace the top-down cooperation approach of the past.

In its 2017 *Strategy for the Internationalisation of Education, Science and Research*, the Federal Government of Germany underlined its principle to cooperate with emerging and developing countries to shape the knowledge-based society and to address global challenges. Within the government's cooperation with Africa, the German Federal Ministry of Education and Research consulted with the AUC and other African partners prior to launching its *Africa Strategy 2014-2018*. This strategy provides the framework for integrated approaches in areas like health, agriculture, and climate change, and comprises activities that interlink research and human and institutional capacity building with entrepreneurial approaches, in cooperation with African countries.

Germany values its African partners in their joint STI activities. To learn with and from each other and to work towards mutual betterment is the underlying principle of all measures. Africa is a continent of manifold richness, and its German partners strive to support the region in realising its vast potential. For that, it requires strategic approaches to overcome local and regional challenges through integrative, interdisciplinary solutions. The German Federal Ministry of Education and Research will continue in its efforts to advance its bi- and multilateral partnerships. It is eager to develop and participate in new innovative targeted approaches in the field of research and education as key factors for economic – and thereby stabilising – development.

The following examples of international partnership initiatives provide a valuable insight into the broad spectrum and nature of topics, partners and instruments which are strengthening the bonds between African and international partners and are moving the continent forward.

Dr Stefan Wagener
(DLR Project Management Agency)



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The AU Science, Technology and Innovation Strategy for Africa (STISA-2024)

► [http://austrc.org/docs/stisa/Science,%20Technology%20and%20Innovation%20Strategy%20for%20Africa-%202024%20\(STISA-2024\)-E.pdf](http://austrc.org/docs/stisa/Science,%20Technology%20and%20Innovation%20Strategy%20for%20Africa-%202024%20(STISA-2024)-E.pdf)

Delivering on the Joint Africa-EU Strategy through Research and Innovation (August 2017)

► http://ec.europa.eu/research/iscp/pdf/policy/rec-17-003-b5_1-africa_web.pdf

Roadmap towards a jointly funded EU-Africa Research & Innovation Partnership On Food and Nutrition Security and Sustainable Agriculture (FNSSA) (2016)

► http://ec.europa.eu/research/iscp/pdf/policy/eu-africa_research_innovation_cooperation_on_fnsa_en.pdf

Roadmap for a jointly funded AU-EU Research & Innovation Partnership on Climate Change and Sustainable Energy (CCSE) (2017)

► https://ec.europa.eu/research/iscp/pdf/policy/ccse_roadmap_2017.pdf

German Federal Government's Strategy for the Internationalisation of Education, Science and Research (February 2017)

► https://www.bmbf.de/pub/Internationalization_Strategy.pdf

German Federal Ministry of Education and Research (BMBF): Africa Strategy 2014-2018

► https://www.bmbf.de/pub/Afrika_Strategie_eng.pdf



Further Information

African Union (AU) Agenda 2063: About

► <https://au.int/agenda2063/about>

New Partnership for Africa's Development (NEPAD)

► <http://www.nepad.org>

G20 Compact with Africa

► <https://www.compactwithafrica.org/content/compactwithafrica/home.html>

Global Research Collaboration for Infectious Disease Preparedness (GLOPID-R)

► <https://www.glopid-r.org>

Coalition for Epidemic Preparedness Innovations (CEPI)

► <http://cepi.net>

German Federal Ministry of Education and Research (BMBF): Middle East and Africa

► <https://www.bmbf.de/en/middle-east-and-africa-2279.html>

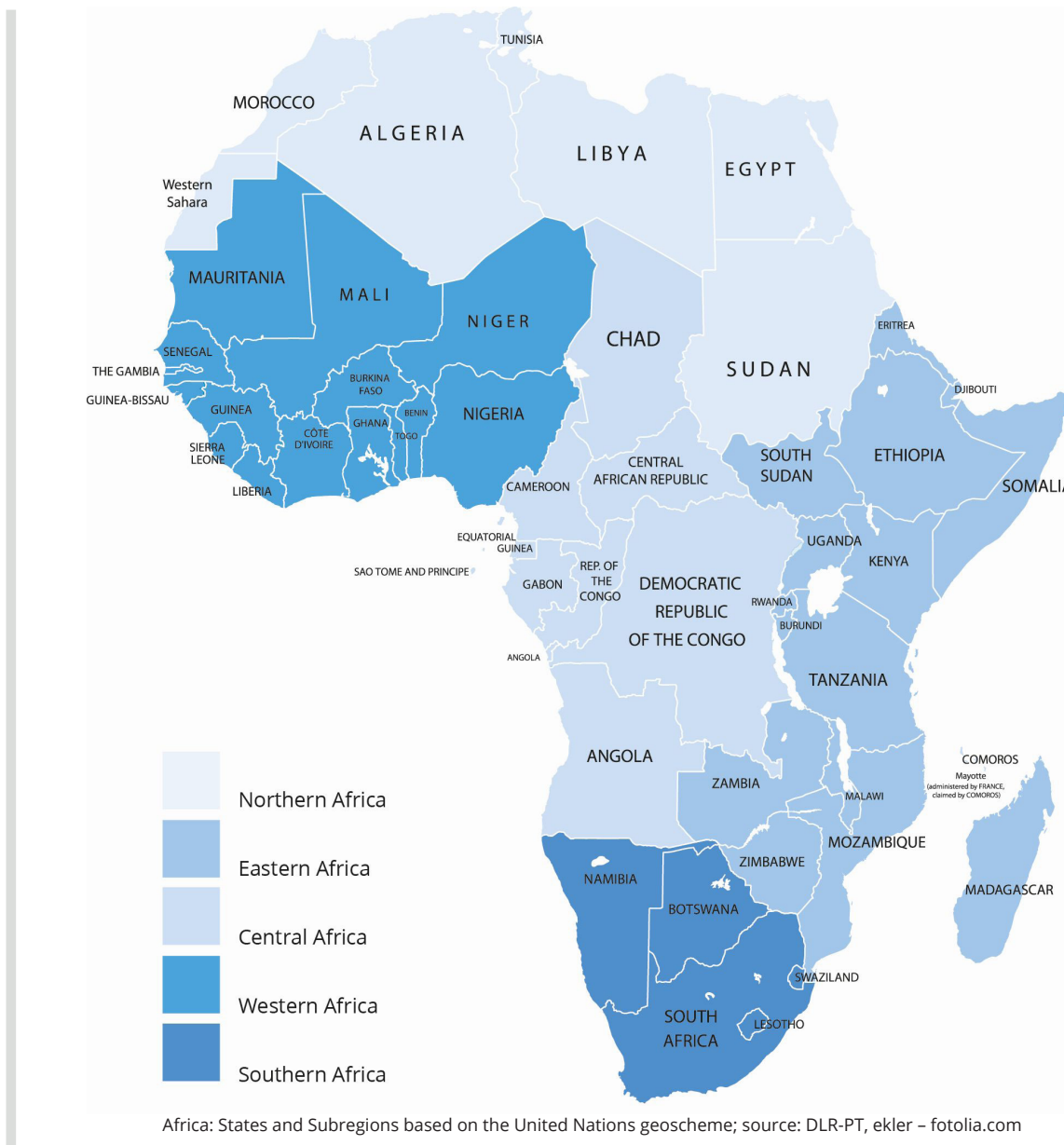
Kooperation international: Länderübersicht Afrika

► <http://www.kooperation-international.de/laender/afrika/>

Facts and Figures on African Higher Education, Research and Development

Deutsche Zusammenfassung

Die Anzahl der Studierenden hat sich in Subsahara-Afrika zwischen den Jahren 1999 und 2015 mehr als verdreifacht. Da jedoch erst 8,5 Prozent einer Altersgruppe studieren, besteht verglichen mit dem Welt-durchschnitt von 36,8 Prozent weiterhin ein großes Wachstumspotential. Dasselbe gilt für die gesamten Ausgaben für Forschung und Entwicklung (FuE), welche in Subsahara-Afrika weiterhin nur einen Anteil von 0,4 Prozent am Bruttoninlandsprodukt ausmachen (Welt-durchschnitt: 1,7 Prozent). Ältere Daten zeigen, dass der Anteil der internationalen Finanzierung von FuE-Ausgaben in einigen Ländern Subsahara-Afrikas zwischen 30 und 60 Prozent beträgt und somit weit über dem entsprechenden Anteil in den OECD-Ländern (6,4 Prozent) und einigen Ländern Nordafrikas liegt.





Source: takasu – fotolia.com

The number of students in tertiary education in Sub-Saharan Africa more than tripled between 1999 and 2016, growing from 2.3 million to 7.4 million students (estimate). However, in 2016 only 8.5 percent of the young population in Sub-Saharan Africa were enrolled in tertiary education. There is significant potential for growth regarding tertiary education in Sub-Saharan Africa until the world average gross enrolment ratio of 36.8 percent is reached.

Sub-Saharan Africa more than quadrupled its gross domestic expenditure on research & development (GERD) between 1996 and 2015. The total amount rose from 3.6 to 14.7 billion USD (PPP). While Sub-Saharan Africa kept R&D expenditure at 0.4 percent of its gross domestic product (GDP), the world average grew from 1.4 percent to 1.7 percent during the same period. Against this background, the African Development Bank Group (AfDB) recommended that all African countries step up their efforts and spend at least one percent of their GDP on research and development. As regards the number of researchers, Sub-Saharan Africa has already seen a sharp increase of more than 50 percent within eight years. The number of researchers (Full Time Equivalents - FTE) grew from 58,117 in 2007 to 92,808 in 2015.

Data on the share of foreign R&D investment in Africa are not always kept up-to-date. The OECD countries had an average share of 6.4 percent in 2015. The respective figures in Northern African

countries are lower than in the OECD (Tunisia: 3.9 percent in 2015; Morocco: 1.7 percent in 2010). Some Sub-Saharan African countries, however, recorded shares between 30 and 60 percent in 2010 (Ghana: 31.2 percent; Kenya: 47.1 percent; Senegal: 40.5 percent; Tanzania: 42 percent; Uganda: 57.3 percent). In South Africa, 12.9 percent of the expenditures were financed from abroad. More recent data or regional totals for Sub-Saharan Africa are not available (Sub-Saharan Africa as referred to in the UIS database comprises all African countries except for the Northern African countries (see map). Data sources: UIS.Stat Database and OECD.Stat Database, extracted on March 1, 2018).

Dr Sonja Bugdahn
(DLR Project Management Agency)



Further Information

UNESCO Institute for Statistics
UIS.Stat Database

► <http://data.uis.unesco.org>

OECD.Stat Database

► <http://stats.oecd.org/Index.aspx>

National Perspectives on Funding Research and Innovation in Africa

The Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED)

Deutsche Zusammenfassung

Die norwegische Förderorganisation Norad nahm im Jahr 2012 das „Norwegian Programme for Capacity Development in Higher Education and Research for Development“ (NORHED) an, um Hochschuleinrichtungen in Ländern mit niedrigem und mittlerem Einkommen zu unterstützen. Ziel ist es, mehr Graduierte besser auszubilden und gleichzeitig Qualität und Quantität der Forschung an den Hochschulen zu steigern. Die Themenschwerpunkte der fünf Unterprogramme sind 1. Bildung, 2. Gesundheit, 3. Management natürlicher Ressourcen, 4. Demokratische und wirtschaftspolitische Steuerung sowie 5. Geistes- und Kulturwissenschaften, Medien und Kommunikation. Ein sechstes Unterprogramm legt einen besonderen Schwerpunkt auf die Kapazitätsentwicklung im Süd-Sudan. Die durch NORHED aktuell geförderten Projekte haben eine Laufzeit von fünf Jahren und umfassen eine Fördersumme von jeweils 15 bis 18 Millionen norwegischer Kronen (1,55 bis 1,86 Millionen Euro). Im Rahmen der NORHED-Projekte werden nicht nur Individuen, sondern auch die Verbesserung von Lehrplänen und von wissenschaftlicher Betreuung sowie der Aufbau von Forschungsinfrastruktur gefördert.



Douglas Tendai Phiri
Adviser-Section for Research,
Innovation and Higher Education
Department of Climate, Energy,
Environment and Research
Norwegian Agency for Develop-
ment Cooperation (Norad)
Oslo, Norway

Education is one of the main priorities of Norwegian development cooperation. Supporting higher education and research for development is a key part of this commitment. The strategic prioritisation of higher education and research is not only in line with the increasing need for internationalisation of higher education institutions but also responds to the growing demands of globalisation, sustainable and equitable development. Higher education institutions (HEI) are important in meeting the increasing need for research-based knowledge and demonstrating the increasing importance of the knowledge economy. As opposed to earlier assertions of higher

education as being only elitist, there is increasing agreement that equitable and quality higher education and research is also vital in fostering equitable and sustainable economic, social, political and environmental development.

Norwegian education policy document *Education for Development* (Meld Str. 25) stresses the importance of education in Norwegian development cooperation. Norway is also fully committed to the Sustainable Development Goals (SDGs) and the 2030 agenda aimed at eradication of extreme poverty, protecting planetary boundaries and promoting prosperity, peace and justice for all. In order to achieve this, there is need for a multi-sectoral approach and strengthening synergies. Higher education and research institutional collaboration are vital tools in the achievement of the SDGs. Although higher education is often associated with SDG4, the role of HEIs and research in promoting evidence based knowledge, innovation and creativity creates synergies across different development goals as a precondition for poverty alleviation. It plays a key role in the main priority areas of Norwegian aid; education, health, private sector development and job creation, climate, renewable

energy and the environment and humanitarian aid. This also includes cross-cutting sectors that guide the development collaboration; gender quality, human rights and climate change as well as anti-corruption. Strengthening quality in higher education and research will enhance skills and knowledge necessary for sustainable development within and across the different priority areas of Norwegian development policy.

The Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED) was launched in 2012 as Norad's main avenue for strengthening higher education institutions in Low and Middle Income Countries (LMIC). The objectives of the NORHED programme is to strengthen the capacity of higher education institutions in LMICs to educate more and better qualified candidates, and to increase the quality and quantity of research conducted by the countries' own researchers. The programme is envisaged to have an impact by contributing to a more skilled workforce, increased knowledge, evidence-based policy and decision-making and greater gender equality.

The NORHED programme consists of five thematic sub-programmes in line with key areas for Norwegian development cooperation; 1) education, 2) health, 3) natural resource management, climate change and environment, 4) democratic and economic governance, 5) humanities, culture, media and communication. In addition, there is a sixth sub-programme focusing specifically on capacity development in South Sudan. Currently, the NORHED portfolio consists of a total of 50 projects across the six sub-programmes. These projects operate in 26 countries, and include 60 universities in Africa, Asia and Latin America in addition to 13 institutions in Norway. The implementation period for the projects is five years. The total budget for the NORHED programme is about 864 million Norwegian Kroners, with each project ranging between 15-18 million Norwegian Kroner.

The NORHED programme differs from previous Norwegian funded programmes. In line with the overall objectives, all projects include the following intervention areas: development of in-country/regional education and research programmes; PhD studies and fellowships; joint research; institutional system

strengthening; publications and dissemination of knowledge; gender balance and gender mainstreaming; and improvement of small-scale infrastructure and scientific equipment.

The NORHED programme gives strong emphasis on partnerships and regional collaboration between universities in developing countries. All projects include minimum one partner institution in LMIC and one partner institution in Norway, but will generally include several LMIC partner institutions constituting a South-South-Norway model. In most projects, one of the LMIC partner institution will be the lead agreement partner with Norad, while in previous programmes this would generally have been the Norwegian partner. NORHED's South-Norway and South-South-Norway partnerships model ensures that interventions are locally-driven and locally-owned by partners fostering local accountability for achievement of results and management of risks. Assessments are done by partners themselves on the institutional capacity to carry out the responsibility of being a lead partner. This also involves an assessment of internal controls, risk assessment and previous experience with management of externally funded projects.

Another important characteristic of the NORHED model is additional focus on institutional capacity development in addition to capacity building of individual students and researchers. A budget component targeted at institutional development and small infrastructure development is included catering for scientific equipment, laboratories, lecture room and special teaching equipment, ICT, Literature and Library etc. In addition, partnership collaborations on activities such as curriculum development, staff and student exchanges, improvements in teaching methods, joint supervision and mentoring are envisaged to build institutional capacity. This has been very critical for the south partners mutually strengthening their capacity at regional levels in different areas spanning from staff and student exchanges and capacity building of both technical and administrative staff.

A good example of the benefits of regional collaborations in the South regards projects involving the University of Juba in South Sudan. Only re-established in 2011, the university has inadequate teaching and

research as well as administrative and technical capacities to offer important programmes matching today's global challenges. The breakout of conflicts in 2013 and 2016 further interrupted the academic and research activities of many researchers and students in the NORHED projects. However, the interruption in academic and research progress has been cushioned by placing South Sudanese students in regional universities in Ethiopia, Uganda, Kenya etc. In some cases, research activities have and continue to be conducted with other regional partners with similar contextual characteristics. Teaching staff from the region are also able to travel and contribute towards delivery of quality education to South Sudanese students.

Research partnerships is another important avenue for the NORHED programme. It is the largest budget component in the NORHED programme. The research component is implemented in the form of research teams of academic staff and PhD fellowships. Overall, the research conducted in the NORHED programme has facilitated context relevant research as the academic partners in the South have the latitude to conceive, develop and conduct research based on their institutional and national knowledge and competence needs. In addition, joint research between South-South and South-North partners from different institutional and national contexts have allowed for different perspectives on issues with both national and global level implications. This NORHED research model acknowledges the diversity of contexts in which research is conducted and applied, and also the global public goods and their increasing complexity that require a combination of interdisciplinary as well as international perspectives.

The experience from the NORHED programme shows that the success of the projects are, in addition to experienced and dedicated academic staff, dependent on institutional-level enabling conditions such as availability of effective administrative and financial systems. With the LMIC partner institution as the lead partner in a project with several project partners involved, it is required that the lead partner has systems and procedures for implementing the institution's regulations in place to manage a project of this size and scope. This can be challenging when institutions exhibit limited institutional capacity. The

holistic approach to capacity development under the NORHED programme foregrounds the importance of enabling conditions, including institutional strengthening at different levels.



Download

Education for Development (Meld. Str. 25)

► <https://www.regjeringen.no/contentassets/118ab85ad919493699f9623aad5652fb/en-gb/pdfs/stm201320140025000engpdfs.pdf>



Further Information

Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED)

► <https://www.norad.no/en/front/funding/norhed/>

Norwegian Agency for Development Cooperation (Norad)

► <https://www.norad.no/en/front/about-norad/>

Swiss-(South) Africa Research Cooperation: Bilateral Cooperation and Institutional Linkages

Deutsche Zusammenfassung

Seit dem Jahr 2007 ist die Universität Basel zusammen mit dem Swiss Tropical and Public Health Institute als sogenanntes „Leading House“ der Schweiz für die Entwicklung der Wissenschaftsbeziehungen mit Südafrika zuständig. Ein besonderes Programm der Universität Basel ist das „South Africa -Switzerland Business Development Programme“ (SSABDP), unter dem Forschenden aus der Schweiz und Südafrika unternehmerische Kompetenzen vermittelt werden. In den Jahren 2012/13 hat das Leading House Basel im Mandat des Schweizerischen Staatssekretariats für Bildung, Forschung und Innovation die Ausdehnung von Förderprogrammen auf weitere afrikanische Länder in West- und Ostafrika vorbereitet. Eine entsprechende Datenbank (www.sareco.org) listet die Ausschreibungen dafür auf. Diese bieten Anschubfinanzierung für die Vorbereitung von bilateralen afrikanisch-schweizerischen Forschungsprojekten. Bei entsprechender Reife des Programms übernehmen die jeweiligen Forschungsförderagenturen die Förderbekanntmachungen. Im Fall von Südafrika und dem gemeinsam entwickelten „Swiss South African Joint Research Programme“ (SSARJRP) ist dies der Schweizerische Nationalfonds (SNF) und Südafrikas National Research Foundation (NRF). Im Fall der erweiterten Zusammenarbeit der Schweiz mit Afrika ist dies die African Academy of Sciences (AAS).



Dorina Kühner
Swiss South African
Program Coordinator
International Relations
University of Basel
Basel, Switzerland

Academic Exchange Service (DAAD), the Dutch organization for internationalization in education (Nuffic), Norwegian Center for International Cooperation in Education (SIU), Finnish National Agency for Education (CIMO) or others could be entrusted to establish and implement such programmes, Switzerland looked out for individual universities with longstanding experience of cooperation in specific world regions and created, in accordance with all actors from academia, politics and industry, the concept of a Leading House for these regions. The University of Basel and the Swiss Tropical and Public Health Institute were designated as Leading House (LH) Basel for South Africa. When the Swiss Confederation and the Republic of South Africa finally signed an agreement in Basel in December 2007 to promote scientific and technological cooperation between Switzerland and South Africa, the LH Basel could officially take up its work with the Swiss South African Joint Research Programme (SSAJRP).



Erich Thaler
African Desk, Cooperation &
Funding, Intern. Agreements
International Relations
University of Basel
Basel, Switzerland

Global problems can only be solved through global partnerships. At around the turn of the millennium, Switzerland expressed its wish to intensify research cooperation with high potential partner countries outside of Europe. Unlike Germany, the Netherlands or Scandinavian countries where government agencies like German

Building upon already existing academic ties, LH Basel and its South African counterpart, the Council for Scientific and Industrial Research (CSIR), along with the South African National Research Foundation (NRF), launched a joint call in the areas of Public Health and Biomedicine, Bio- and Nanotechnologies, and Human and Social Sciences. In Phase I (2008-2012), the SSAJRP managed 16 Joint Research

The University of Basel has developed close ties with Africa over several centuries. Since the founding of the Basler Mission (today mission21) in 1815, Basel has been building competence in research on Africa. Vital for the establishment of scientific relations has been the Swiss Tropical and Public Health Institute, whose research on malaria prevention in Tanzania was awarded the Prince of Asturias Prize.

The reputed Basel University Centre for African Studies and the exhaustive collection Basel Africa Bibliographies (Namibia Resource Centre and Southern Africa Library) are regularly contacted by international Africa researchers. The inauguration of the Centre of Competence on Africa and the nomination of the University of Basel as Leading House for a bilateral collaboration program with South Africa (SSAJRP) have further consolidated the University's expert position in the field of African studies.

Projects (JRP), 9 projects in industry-academia cooperation and facilitated over 100 exchange activities between new and established researchers from both countries. Subsequently, in order to provide a platform for skill-exchange between Swiss and South African actors in technological entrepreneurship, ties with industry were intensified and an entrepreneurship program was initiated with the Technology Innovation Agency (TIA).

The South Africa-Switzerland Business Development Programme (SSABDP) supports post graduate, PhD and postdoc students from all Higher Education Institutions (HEIs) in South Africa and Switzerland, in order to bring their

inventive research outcomes to the marketplace. The delegates are selected on an annual basis to participate in highly competitive training programs such as the Venture Leaders Week, which offers visits to start-up companies and workshop sessions on topics including intellectual property, marketing and doing business in the partner country.

The SSAJRP also successfully established two joint international Bilateral Research Chairs: the migration and diversity initiative between the Universities of Witwatersrand and Neuchâtel and the global environmental health venture between the University of Cape Town and the Swiss Tropical and Public Health Institute. The goal of these research chairs is to strengthen and improve the research and innovation capacity of public universities for producing high quality postgraduate students, research, and innovation outputs.

Following an evaluation by the program funding the Swiss Ministry of Education, Research and Innovation (SERI), the four-year-mandate conferred to the University of Basel and the Swiss Tropical and Public Health Institute (Swiss TPH) in 2007, was extended in 2012 for another four years and linked to the task of extending the list of partners with high scientific potential in Sub-Saharan Africa.

The responsibility for joint research projects between Switzerland and international partners has shifted to the funding agencies from the second funding phase (2013-16) onwards, i.e. the Swiss National Science Foundation (SNF) and the South African National Research Foundation (NRF) respectively. The SNF and the NRF were mandated to launch the call for JRPs, to organize a joint panel evaluation of the submitted proposals and to monitor the funded research projects (25 in phase II). Currently, the third phase of the collaboration boasts 12 JRPs which will run for a period of four years (2017 to 2020) and will be funded by both partners on an equal basis.

An open call for proposals, building on the expertise of Swiss researchers and their existing ties to African research institutions, following a bottom-up approach similar to that of the first phase, led to the identification of three main areas of common research work: Agriculture, Sustainability, and Biodiversity; Life Sciences and Health; Knowledge Production and Dissemination. Almost 50 cooperation projects that facilitated exchange and joint meetings between Swiss and African researchers in Western and Eastern Africa could be funded during this period.

For dissemination purposes, LH Basel created the SARECO database for the use of new scholars. It provided information on Swiss-African research projects, lead participants and funding instruments made available by various actors. At the same time, LH Basel actively invited partners to join this database and share information on project funding in the framework of North-South cooperation. The database was built up as a direct response to the feedback on the first cooperation round, received in 2011, from participating researchers who asked for more transparency in the information flow, especially for young researchers.

The African Academy of Sciences was identified as a strong partner in Africa and a joint call in the areas of Global Environmental Health and Nanosciences was launched as early as the end of 2016 for the follow-up period between 2017-2020.

This instrument, much like the ones before, complemented already existing SNF-funding lines and funded up to 12 months of joint cooperation. Additionally, it contributed to research capacity building and participant preparation for joint proposal submission within larger Swiss-African and/or European funding schemes.

In addition, LH Basel participates in the annual conferences of the recently established African Network for the Internationalisation of Education (ANIE) as well as in the annual meetings of the so-called Donors' Harmonization Group whose aim is to identify funding synergies in North-South cooperation programs and to work on standardizing impact measurements.

Due to the programme's national reach, the task also required the involvement of a variety of Swiss actors from all linguistic regions and types of Higher Education Institutions. Participants include research universities, hospitals and universities of applied sciences in Lugano, Bern, Geneva, Lausanne, Neuchâtel, Zurich and Basel.



Further Information

University of Basel: Swiss African Research Cooperation (SARECO)

► <https://www.unibas.ch/en/University/Administration-Services/The-President-s-Office/National-and-International-Cooperation/International-Relations/Joint-Programs/Swiss-African-Research-Cooperation.html>

Database Swiss African Research Cooperation (SARECO)

► <http://www.sareco.org>

African Network for Internationalization of Education (ANIE)

► <http://www.anienetwork.org>

African Academy of Sciences (AAS)

► <http://www.aasciences.ac.ke>

National Research Foundation (NRF) of South Africa

► <http://www.nrf.ac.za>

Swiss National Science Foundation (SNSF)

► <http://www.snf.ch/en/Pages/default.aspx>

University of Basel: Swiss South African Joint Research Programme (SSAJRP)

► <http://www.unibas.ch/ssajrp>

University of Basel: Academia-Industry Training

► <https://www.unibas.ch/en/University/Administration-Services/The-President-s-Office/National-and-International-Cooperation/International-Relations/Joint-Programs/Swiss-South-African-Joint-Research-Programme/Academia-Industry.html>

University of Basel: Centre for African Studies

► <https://zasb.unibas.ch/en/home/>

Swiss Tropical and Public Health Institute

► <https://www.swisstph.ch/en/>

International Funding of Research and Innovation in Africa: The Case of China

Deutsche Zusammenfassung

Seit dem Jahr 2000 finden im Rahmen des „Forum on China Africa Cooperation“ (FOCAC) alle drei Jahre hochrangige Treffen von Regierungsvertretern fast sämtlicher Staaten Afrikas mit Vertretern von China statt. Zu den Zielsetzungen des FOCAC gehört seit 2009 im Rahmen der „China Africa Science and Technology Partnership“ auch die Entsendung von afrikanischen Wissenschaftlern nach China und die Durchführung gemeinsamer Forschungsprogramme. In Bezug auf die praktische Umsetzung dieser Programme bleibt allerdings vieles unklar. Südafrika nimmt innerhalb von Afrika eine Sonderrolle ein, da die wissenschaftlich-technische Zusammenarbeit mit diesem Land für China einen hohen Stellenwert hat. Die südafrikanische National Research Foundation (NRF) führt gemeinsame Förderbekanntmachungen mit der chinesischen nationalen Wissenschaftsstiftung NSFC bzw. dem chinesischen Wissenschaftsministerium MOST durch.



Dr Sven Grimm
Head of Department „Training“
German Development Institute
(DIE)
Bonn, Germany
Extraordinary Associate Profes-
sor at Stellenbosch University
Stellenbosch, South Africa

International science cooperation is a marginal topic in China-Africa relations. While China's government sees science and technology as a driver for (domestic) sustainable development by 2020, research is still a somewhat secondary topic in cooperation with African states - with the notable exception of South Africa. South-South cooperation in its rhetoric sounds very different from Western engagement. However, China's dialogue and science cooperation activities are mostly directed towards OECD countries. Consequently, science cooperation with Africa is rather a topic within development cooperation. The only real "eye-level partnership" or "win-win"-setting in science cooperation with African countries is in China's relationship with South Africa.

Science in international cooperation

For China-Africa relations more broadly, cooperation in research is very much a niche topic in their international cooperation. In the 1980s, research and

science cooperation with Africa meant donations of equipment to universities, providing some teaching staff to African higher education institutions and running a number of laboratories in African countries. In teaching, too, the exchange is mostly one-sided, as China rarely sends students to Africa, but rather has a volunteer scheme that includes sending teachers since 2004. Since the 2000s, Chinese language teaching was added as an area of engagement with Confucius Institutes (CI) across the continent. CIs are institutionally linked to local Universities, and thus could be used for internationalisation purposes of the respective host university. Language scholarships are provided, and CIs can stimulate curiosity of China. They are, however, a limited instrument, as their focus is on cultural exchanges, not specific research. Stellenbosch University in South Africa, for instance, established a Centre for Chinese Studies alongside the Confucius Institute, disentangling the two in 2009, so as to provide for own research capacities.

Science and training cooperation in the FOCAC framework

Chinese funding for research in Africa is part of the commitments during the tri-annual Forum on China-Africa Cooperation, FOCAC, which is in place since 2000. The pledges under FOCAC have become more sophisticated over time. In 2000, it still was mostly about sending more medical teams to Africa, with a mission to train local staff. Three years later, talk already was about training 10,000 Africa personnel in various fields. In 2009, the commitments had

substantially increased and included the launch of a China-Africa science and technology partnership; the carrying out of 100 joint demonstration projects on science and technology research as well as receiving 100 African post-doctoral fellows in China. Additionally, that year, China *inter alia* promised to train 20,000 professionals in various fields and launch a China-Africa joint research and exchange programme. Following-up on this programme – which projects did it fund and in which topic areas? – is rather difficult, as no central data base of the projects is made public – much in line with general issues of publication of individual, country-by-country data.

University cooperation – twinning and scholarships

African universities feature in China's strategic internationalisation of its universities through the 20+20 partnerships between universities, i.e. 20 Chinese universities partnering with 20 African counterparts. The matchmaking of universities was somewhat difficult and respective interests have to be explored first, as matching happened rather by finger-pointing from Beijing. Both, African countries and China, however, seem to rather aim at other areas in the global North for cooperation. There are post-colonial linkages to education systems in Europe and the research key players are considered to be rather in the OECD world. One noticeable exception are South African research institutions, some of which are globally in the excellence segment, and are consequently wowed by Chinese institutions. While cooperation is promoted by both governments, practicalities are more of an obstacle and South African institutions have in the recent past rather aimed at other partners, where traditions are more easily compatible.

Included in the FOCAC umbrella is a quantitative goal of the Chinese scholarship council. China's aid policy of 2014 reports that "From 2010 to 2012, the Chinese government assisted 76,845 foreign students to study in China." It remains unclear in which areas or which levels of studies, though.

However, language barriers as well as differences in academic systems are steep obstacles. South Africa's Department of Higher Education and Training states that "The scholarship may be awarded for post-

graduate (Masters, PhD or Post-doc) or non-degree Chinese language studies."

Cooperation with South Africa – a league of its own also for China

Like with other international actors, South Africa is in a bracket of its own in China's international cooperation. China and South Africa have bilateral relations only since 1998, which include an agreement on science and technology cooperation since 1999. Science and technology is one of seven key sectors for cooperation between the two countries, including joint calls through the respective national research foundations and the Chinese Ministry of Science and Technology (MOST). Chinese actors emphasise the beneficial bilateral cooperation in biology, information, mining, laser, new materials and other fields, where South Africa has knowledge to offer for China. The joint South Africa-China call for proposals issued by the South African National Research Foundation in 2014, for instance, lists the following eligible topics: Biotechnology, Natural and Traditional Medicine, New and Renewable Energy, Palaeontology, and Water Research. The call for project proposals 2017 listed as eligible topics Advanced Materials, Ocean Science, Traditional Medicine, and Deep Mining. In April 2017, science park cooperation was added to the number of initiatives targeting South Africa. Science and technology parks are a specific instrument of Chinese engagement. They were founded in China since the early 1990s, modelled after the Taiwanese experience and their role in Taiwan's economic development through innovation.

Way forward

The latest FOCAC document after the Johannesburg summit in 2015 reads: "The two sides attach importance to knowledge sharing and technology transfer, and will carry out exchanges in technological innovation policies and the building of science and technology parks and encourage research institutions and enterprises to have intensive cooperation." These are encouraging words, yet they have to be put into practice.

Overall, China does not differ fundamentally from Western countries in its engagement with African

science and research. The efforts by China are appreciated and no small feat given China's status as a developing country. This is, however, disappointing when considering the rhetoric of fundamental difference in South-South cooperation. More can and should be done in joint research activities, engaging in partnerships that have been initiated.



Further Information

Confucius Institutes (CI) Headquarters

▶ http://english.hanban.org/node_7716.htm

Forum on China-Africa Cooperation (FOCAC)

▶ <http://www.focac.org/eng/>

FOCAC: China-Africa Joint Research and Exchange Program

▶ <http://www.focac.org/eng/xsjl/zflhyjjjh/>

China Scholarship Council (CSC)

▶ <http://www.csc.edu.cn>

National Natural Science Foundation of China (NSFC)/NRF Cooperation 2018 Call for Joint Proposals

▶ <http://www.nrf.ac.za/division/funding/national-natural-science-foundation-china-nsfcnrf-cooperation-2018>

Stellenbosch University: Centre for Chinese Studies

▶ <https://www0.sun.ac.za/international/about/our-international-networks-and-affiliations/asia-africa-relations/centre-for-chinese-studies.html>

The French National Research Institute for Sustainable Development: Its Work in Africa

Deutsche Zusammenfassung

Das „Institut de recherche pour le développement“ (IRD) wurde im Jahr 1943 gegründet. Unter der Leitung des französischen Ministeriums für Hochschulen und Forschung sowie des Ministeriums für Auswärtige Beziehungen führt das IRD Forschungen im Rahmen der Entwicklungszusammenarbeit in einer Vielzahl von Ländern durch. Ein Schwerpunkt der Aktivitäten liegt auf Afrika. Die Forschungseinrichtungen des IRD in 17 afrikanischen Ländern nutzen verschiedene Instrumente, um sich mit afrikanischen Hochschulen oder außeruniversitären Forschungseinrichtungen vor Ort zu vernetzen und gemeinsam zu forschen. Zusätzlich vergibt das Institut in gewissem Umfang Fördermittel an den afrikanischen wissenschaftlichen Nachwuchs. Das IRD hat unter dem 7. EU-Forschungsrahmenprogramm das Projekt ERAfrica mit dem Ziel koordiniert, afrikanische und europäische Förderorganisationen zu vernetzen.



Dr Jean Albergel
Senior Scientist
Laboratory of studies on Interactions between Soil-Agrosystem-Hydrosystem (LISAH)
French National Research Institute for Sustainable Development (IRD)
Montpellier, France

The IRD (French National Research Institute for Sustainable Development) is a research organisation unlike any other in the field of European research for development. It is a French public scientific and technological institution operating under the joint authority of the French Ministry of Higher Education and Research and the Ministry of Foreign Affairs. The IRD endeavours to meet major development challenges by undertaking research, training, and innovation activities in developing and emerging countries in the intertropical and Mediterranean areas with an ongoing focus on sharing knowledge and pooling resources and skills.

A priority is given to Africa where IRD is formally represented in 17 African countries and one French Over-Sea department (Reunion Island). The IRD wants to be represented at every location where research units linked to the institute operate. In 2016, 28 IRD representatives were assigned to countries or French overseas territories. The extended network will count around 50 representatives by the end of 2018. In 2016, 383 IRD agents were posted in Africa,

and approximately 53,000 days of scientists short stays are recorded each year.

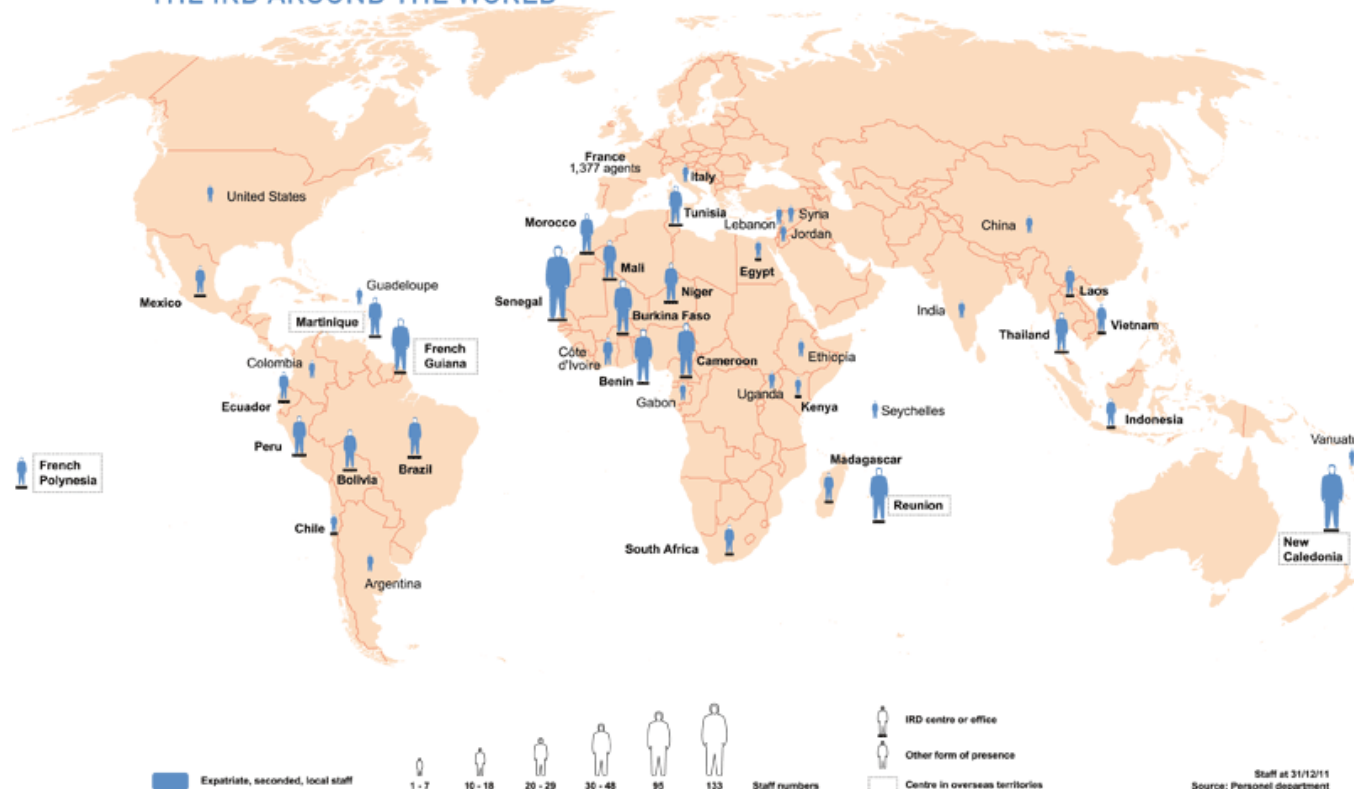
Based on an interdisciplinary approach, the IRD has focused its research for over 70 years on the relationship between man and its environment, in Africa, Mediterranean, Latin America, Asia and the French tropical overseas territories.

All the research projects are carried out with partners and address issues of crucial importance for the developing and emerging countries to meet the Sustainable Development Goals (SDG). The African and Mediterranean priority concerns particularly sensitive topics:

- water resources,
- the hazards and natural risks,
- terrestrial and coastal eco-systems,
- production and food safety,
- emerging diseases,
- living conditions and population mobility.

The IRD has forged long-term links with research centres, higher education institutes and multilateral development institutions in Africa. It is one of the leading international research agencies working on development issues in the continent. Despite the instability that exists in certain regions, IRD maintains local operations in countries regarded as a priority,

THE IRD AROUND THE WORLD



IRD establishments in the world; source: French National Research Institute for Sustainable Development (IRD)

in terms of public development aid. This is especially the case of the least developed countries, such as those in Sub-Saharan Africa.

The IRD is not a funding agency but developed out of its own budget or with the help of agencies for development some tools for strengthening collaborative research or for reinforcing the research capacities of scientific communities in the South. The collaborative research tools are:

IRD main figures in 2016 were an annual budget of 230 million Euro; 2,019 agents including 805 researchers; 1,214 engineers and technicians; 292 agents operating under local law. 34.5% of agents are posted outside mainland France and hosted by partner research institutions or universities. The scientific production was almost 1,300 publications in the web of science over which 52% are co-signed with partner scientists in developing and emerging countries.

- International joint research unit:**
 An International Joint Research Unit ("Unité mixte Internationale de recherche" or UMI) is an administrative structure, which is set up by different higher education and research institutions by pooling human

resources and equipment, based on a joint strategy and common scientific project. Once a research unit obtains the "joint research unit or UMI" status, it gains access, for five years, to two types of funding: that of the Ministry of Higher Education and Research and that of collaborating research organisations. Three UMIs are based in Africa, one on modelling of complex systems (Morocco, Senegal and Cameroun) one on Aids (Cameroun, Uganda, Senegal) and one on resilience in Côte d'Ivoire.

- International joint research lab:**
 Since 2007 the IRD implemented international joint research labs (LMI) as part of its on-going mission to support training, research and to promote research in the field of development, to consolidate scientific communities in the South and to strengthen North-South and South-South collaborations. These structures aim to encourage the sharing and matching of scientific skills and objectives around a common scientific theme, which can be investigated

at a regional or international level. 16 LMIs are ongoing in Africa on various topics like health, climate change, sustainable agriculture, water resources, marine sciences, fisheries.

Guided by the twofold conviction that scientific research can offer solutions to development issues, and that development can be brought about by reinforcing scientific communities in the South, IRD makes a point of including capacity-building actions in the projects it undertakes. It also develops specific programs for individuals, teams as well as institutional support.

Three focal areas are developed, with different programs grouped together in each of them:

1. Supporting individual training in research sectors (individual fellowship).
2. Promoting the formation of research teams and reinforcing their skills, autonomy and competitiveness in an international environment (funding young research teams, JEA).
3. Favouring the institutional development of the research environment in the South and its integration in the global research world.

22 Young Associated Teams are funded at this time in Africa. Often the JEA is a first step before applying for a LMI.

The ERAfrica project was a unique undertaking. Funded by the European Union's Seventh Framework Programme, the project was the first to bring together research funding agencies from Africa and Europe to jointly design and launch instruments, regulations, and procedures for funding collaborative, bi-regional research projects.

ERAfrica provided the opportunity for true shared ownership of research and innovation cooperation between Europe and Africa. In this Framework, ERAfrica serves as a model for cooperative ventures between Africa and Europe.

In Africa but also in other tropical or Mediterranean countries, the IRD encourages multilateral cooperation, North-South as well as South-South between countries and continents. The IRD seeks to draw the

European Research Area to the most remote regions of the world. Thus, the IRD has coordinated or simply participated in all European programs on partnership and policy dialogue in Science, Technology and Innovation between Africa and Europe. The IRD coordinated the very successful ERAfrica project.



Further Information

Institut de Recherche pour le Développement (IRD)
(in French)

► <http://www.ird.fr>

French National Research Institute for Sustainable
Development IRD (in English)

► <http://en.ird.fr>

IRD in Western and Central Africa

► <http://en.ird.fr/the-ird-in-the-world/western-and-central-africa>

IRD in Eastern Africa, Southern Africa and the
Indian Ocean

► <http://en.ird.fr/the-ird-in-the-world/eastern-and-southern-africa-indian-ocean>

IRD in Northern Africa and Middle East

► <http://en.ird.fr/the-ird-in-the-world/northern-africa-and-middle-east>

ERAfrica

► <http://www.erafrica.eu>

The National Research Foundation of South Africa: Science and Technology Collaboration within Africa and Beyond

Deutsche Zusammenfassung

Die „National Research Foundation“ (NRF) ist ein zentraler Akteur in der wissenschaftlich-technologischen Zusammenarbeit Südafrikas mit anderen Ländern. Derzeit managt die NRF ungefähr 45 bilaterale Abkommen mit Ländern innerhalb und außerhalb von Afrika sowie 10 multilaterale Kooperationen. Einen besonderen Stellenwert hat die Partnerschaft mit den BRICS-Ländern Brasilien, Russland, Indien und China. Seit dem Jahr 2014 kooperieren die BRICS mit dem Ziel, eine global wettbewerbsfähige Forschung zu fördern. Innerhalb von Afrika ist die NRF eine führende Förderorganisation, die auch Kapazitätsaufbau für andere afrikanische Länder leistet. So vergibt die NRF zusammen mit der Akademie TWAS (The World Academy of Sciences for the advancement of science in developing countries) Stipendien an Forschende aus anderen afrikanischen Ländern, die in Südafrika promovieren (NRF-TWAS African Renaissance Doctoral Fellowships). Weiterhin unterstützt die NRF die „Science Granting Councils Initiative“ (SGCI; siehe auch Seite 45 ff.) und administriert die Förderbekanntmachungen der multilateralen Initiative LEAP-Agri im Rahmen eines „Call Secretariat“ (siehe auch Seite 51 ff.).



Prudence Makhura
Director Overseas Collaborative
Grants and Initiatives
National Research Foundation
Pretoria, South Africa

Excellence in scientific research is a key imperative in the realisation of a globally competitive science system. The mandate of the National Research Foundation (NRF) of South Africa supports and promotes research and human development through funding and the provision of the necessary research infrastructure to facilitate the creation of knowledge, innovation and development in all fields of science; and supports and promotes public awareness of, and engagement with science. Through a multiplicity of mechanisms and robust strategic partnerships, internationalisation underpins and supports the accomplishment of these goals.

The African Union (AU) Agenda 2063, and the Science, Technology and Innovation (STI) Strategy for Africa (STISA-2024) recognises STI as one of the major drivers and enablers to achieve the development goals of the African Union and its Member States.

The strategy envisions that Africa's sustained growth, competitiveness and economic transformation will require sustained investment in new technologies and continuous innovation in strategic areas such as agriculture, clean energy, education, health and bio-sciences, among others. STISA-2024 provides a platform for Science Granting Councils, such as the NRF, to play a key role both as facilitator and active collaborator in the continent's science, technology and innovation efforts. The importance of leveraging international and strategic resources to support effective partnerships for the implementation of these policy intentions cannot be over-emphasised.

Conventions by both the Southern African Development Community (SADC) and the New Partnership for Africa's Development (NEPAD), as currently driven by the African Ministers' Committee on Science and Technology (AMCOST), place further emphasis on the international function within Science Granting Councils. These reflect key objectives of human resources and skills development to foster equitable and sustainable growth at regional and continental levels with a clear focus on the role of science and technology. All of the above premise an adequately resourced international function within the NRF to effectively enable these proposed and mandatory functions and activities.

The increasing number of bi-, tri-, multilateral and strategic investments enables collaborative research,

inclusive capacity development and institutional strengthening. The NRF's ability to convene and manage international programmes has grown significantly over the years, and together with a number of Science Granting Councils on the continent, contributes to a collective approach to quality improvement and enhancement of the knowledge endeavours. Through the national Department of Science and Technology (DST), South Africa has concluded bilateral science and technology agreements with 24 other African countries. The aim of these agreements is primarily to support and promote quality research, address the skills shortage and accelerate the STI development within the African continent.

The leveraging of international partnerships and the measuring of impact of investments are key aspects that the case for internationalisation must sustain. For South Africa and the continent at large, this means continuous reflections on how internationalisation supports STI contributions to seeking innovative, affordable, sustainable and long term solutions to improving the lives and livelihoods of Africa's citizenry.

Furthermore, the emergence of new geo-networks such as BRICS (Brazil, Russia, India, China & South Africa) and MINT (Malaysia, Indonesia, Nigeria & Turkey) with similar aspirations towards global competitiveness in science and technology present an unprecedented opportunity for South Africa (SA), and the NRF more specifically, to strategically engage with international partners for mutual benefit, innovative resource mobilisation, and a strategic expansion of collaborative frameworks aligned to national priorities and mandates.

Through its Strategy 2020, the NRF enabled significant growth in its international joint research grants in the 2015/16 financial year, aligned with new international agreements and renewal of programmes. To date, the NRF administers and funds approximately 45 (overseas and Africa) bilateral science and technology agreements, 31 international scientific unions and facilitates 10 strategic and multilateral engagements. The increase in expenditure is largely due to the expansion of directed initiatives, as well as resuscitation of strategic programmes, such as the World Academy of Sciences (TWAS) agreement

and the BRICS science and technology agreement. Other programmes such as the SA/Norway (SAN) COOP, SA/Germany Programme and the SA-Swiss Joint Research Programme (see page 14 ff.) have also contributed to the growth in funding commitments.

The NRF has also demonstrated commitment towards securing the next generation of systems thinking and systems analysis researchers through initiatives such as the Southern African Systems Analysis Centre (SASAC).

This selection of funding instruments has positioned the NRF as a leading funding agency in Africa. Additional large strategic initiatives such as the African VLBI (Very Long Baseline Interferometry) Network (AVN), the Science Granting Councils Initiative (SGCI) (see page 45 ff.), the Newton Fund, and a 19-country cohort for joint funding in support of food and nutrition security (LEAP-Agri; see page 51 ff.) have enhanced the international profile of the NRF and its partners. This notion includes also an approach to ensure that the NRF's role as a science council is extended beyond funding only, and includes a role of a knowledgeable, facilitative and acknowledged knowledge broker.

In its Strategy 2020, the NRF aims to remain focused on (1) promoting research excellence through funding and facilitating international research programmes, (2) creating knowledge through world-class research in Africa and beyond, linked to existing expertise and priority areas, and (3) building and reinforcing sustainable research networks in order to accelerate the production and uptake of new knowledge.

The Southern African Systems Analysis Centre (SASAC) provides an opportunity for young, emerging doctoral candidates to advance their research under the supervision of senior researchers/scientists of both the International Institute for Applied Systems Analysis (IIASA) and South Africa. SASAC will be a strategic area of investment by both the DST and the NRF in future, building on the first successful iteration during 2012/13 – 2014/15.

**Download**

The National Research Foundation of South Africa: Overseas Cooperation Information Brochure

► <http://www.nrf.ac.za/sites/default/files/documents/Overseas%20Cooperation%20Information%20Brochure.pdf>

The National Research Foundation of South Africa: Fostering Science and Research Collaboration in Africa (2015)

► http://www.nrf.ac.za/sites/default/files/documents/NRF%20Africa%20Engagements_2015.pdf

NRF-TWAS Doctoral Scholarships and NRF-TWAS African Renaissance Doctoral Scholarships: Framework Document (May 2017)

► http://www.nrf.ac.za/sites/default/files/documents/Framework%20NRF%20-TWAS_African%20Renaissance%20Doctoral%20Scholarships%202017_Funding%20Framework%20Call_25%20May%202017_FINAL.pdf

**Further Information**

National Research Foundation (NRF) of South Africa

► <http://www.nrf.ac.za>

Department of Science and Technology (DST), South Africa

► <http://www.dst.gov.za>

BRICS (Brazil, Russia, India, China & South Africa) Science, Technology and Innovation Framework Programme

► <http://brics-sti.org>

Southern African Systems Analysis Centre (SASAC)

► <http://sasac.ac.za>

African Very Long Baseline Interferometry Network (AVN)

► <http://www.aerap.org/africanradioastronomy.php?id=32>

The African-German Network of Excellence in Science (AGNES)

Deutsche Zusammenfassung

AGNES wurde im Jahr 2011 von Vertretern der Alexander von Humboldt-Stiftung (AvH) und den damit verbundenen afrikanischen Alumni gegründet, um Wissenschaftlerinnen und Wissenschaftler in Subsahara-Afrika und Deutschland miteinander zu verbinden. Im Wesentlichen wird die Arbeit von Freiwilligen geleistet. AGNES strebt an, den Aufbau von Forschungskapazitäten in Afrika voranzutreiben und die Mobilität der Wissenschaftlerinnen und Wissenschaftler in beide Richtungen zu stärken. Seit 2012 wird der „AGNES Junior Researcher Grant“ an exzellente afrikanische Promovierte vergeben, die an einem Post-Doc Aufenthalt in Deutschland mit Förderung der AvH interessiert sind. Seit 2016 ermöglicht der „AGNES Intra-Africa Mobility Grant“ Forschenden aus Subsahara-Afrika Kurzaufenthalte in anderen Ländern der Region. Das Instrument trägt so zur innerafrikanischen Vernetzung bei.



Dr Heather G. Marco
President of AGNES
Senior Lecturer and Researcher
at the University of Cape Town
Cape Town, South Africa

ing Board and the Board of Trustees are interested academics living and working in Africa and in Germany, with a burning desire to see Africa succeed in all spheres, and recognising that quality higher education and excellence in research form the necessary foundations on which to build an Africa that can sustain all her peoples, and contribute resourcefully to the rest of the world.

ITB: Which instruments do you use?

Heather G. Marco: In the five years of establishment, AGNES has created two sponsorship programmes. Since the inception of the AGNES Junior Researcher Grant in 2012, we have awarded grants to 60 African postdocs. This recognition of individual excellence and mentorship from AGNES members has served as encouragement for many of the grantees: some have been offered lectureships in their home countries, others have attained academic promotion, many have improved their academic standing by publishing more papers and securing postdoctoral positions, including the prestigious AvH fellowships for a postdoc in Germany.

The AGNES Intra-Africa Mobility Grant, inaugurated in 2016, enabled us to comprehensively fund 17 Masters and Doctoral students to spend up to two months abroad in the region, linking up with experts for critical aspects of research and initiating new collaborations on the continent. A further 16 post-graduates are sponsored by AGNES in 2017 to explore the academic institutes of Sub-Saharan Africa in pursuit of achieving their research goals. Such mobility visits are excellent eye-openers for young

Interview with Heather G. Marco

ITB: What are the strategic goals pursued by your organization or project with regard to the funding of research and development in Africa (including pan-African or regional strategic goals)?

Heather G. Marco: AGNES is a supra-regional network that operates to promote and support regional networking and the professional exchange of scholars within the Sub-Saharan region, and between the region and Germany. Furthermore, we strive to introduce young African researchers to Germany as a research destination, via the Alexander von Humboldt Foundation (an internationally recognised hallmark of scholarly excellence). At the same time, we also want to promote Africa as a research destination to highly qualified German scientists, as we have unique research possibilities in the region. Moreover, we aim to participate in political discourse on promoting and strengthening scientific excellence and academic capacity in Sub-Saharan Africa. AGNES is run on a voluntary basis, except for one paid staff member – a part-time administrator. The Govern-

African scholars as to just how much the region has to offer in academic terms!

AGNES welcomes opportunities to discuss issues on expansion of scientific and academic capacities in Africa, as well as how to deal constructively with developmental problems in the region. This we do at various fora and with different funding bodies, including participative involvement of African members into German policy-making with regard to funding/plans for development in Africa. In 2017, AGNES accepted invitations from the Humboldt Foundation to actively participate in meetings in the USA and Germany; we presented papers at the 14th General Conference of the Association of African Universities in Ghana and at the 2nd Developing Countries Robotics Forum in South Africa. AGNES also is represented at various regional, Humboldt-funded specialist conferences (kollegs) in Africa to encourage excellence and cooperation for the good of Sub-Saharan Africa.

ITB: What is the amount of funding involved and who are the main recipients (Universities/Research Institutes, Think Tanks, individuals, SMEs ...)?

Heather G. Marco: The AGNES sponsorship is mainly for individuals in Africa who have demonstrated excellence in their respective academic discipline; ALL disciplines are eligible. The Junior Researcher Grant is worth EUR 1,000 to each recently graduated postdoc; this grant has been sponsored by the German Federal Ministry of Education and Research (BMBF), the Humboldt Foundation and The World Academy of Sciences (TWAS). An amount of EUR 20,000 is received annually from the Humboldt Foundation to host the AGNES office running costs, including the administrator's salary, a grant selection committee meeting, an annual Board meeting and general meeting with ordinary members.

BMBF sponsored the Mobility Grants to a total of EUR 79,600 over the past two years; the bulk of this money is allocated to the young postgraduate grantee, as well as a token amount to the research host of EUR 100 – 200 per month as a research allowance, on request. A small portion of the overall funding is used for the administrative costs and for hosting a grant selection committee meeting.

ITB: In case there is a regional/institutional/subject focus: Could you give reasons for focusing your efforts on specific subjects, regions, countries or actors? Have you encountered any specific challenges? What could other countries or organizations which plan to promote research and development in Africa learn from your experience?

Heather G. Marco: AGNES is focused on Sub-Saharan Africa and Germany. The reasons are not political, nor divisive. Sub-Saharan African countries developed differently, consequently have different problems compared to the rest of the continent, and have fewer academics per 10,000 inhabitants. Yet, several countries in the region show pockets of excellence in the form of Humboldt fellows; it is the vision of AGNES to bring the existing expertise within the African Humboldt Network together in an outwardly visible manner, and to increase the academic excellence in the region to effect positive change in civil society, politics and business.

The importance of higher education and science/technology is also entrenched in the African Union Agenda 2063. The African Founder Members of AGNES decided to partner with Germany, a country that provides its citizens with technological skills training and quality education at all levels to improve and maintain high socio-economic conditions. The Humboldt Foundation is especially well-known throughout the world as a prestigious, fair and generous proponent of excellence in research. They provide postdoc fellowships in Germany and encourage their grantees to return to their home countries, where they continue to receive moral and financial support (on request).

The overarching challenge is to gain and maintain credibility in a region where many initiatives have started and faltered due to lack of interest, sponsorship/finance and vision. The region is vast, the problems manifold, it is easy to sink into despair and apathy, plus there are people who are only interested to assist against payment, or public recognition or have a hidden agenda.

Advice? Start small, work very hard and consistently, be humble, use money prudently and instil in grant recipients also the value of sponsorship and the need

to operate transparently. Be grateful for financial contributions towards the project but be wary that it does not come with alien principles/demands. Don't be impatient but have a clear plan/path in mind that you work towards. People may scoff in disbelief but push on because the goal of promoting research and development is important. Mingle with people of all spheres – it assists in refining your work strategy and it brings you in touch with people who can strengthen the concept. Keep the faith that your humble contribution will make a change.

The interview was conducted by Dr Stefan Wagener (DLR Project Management Agency).



Further Information

African-German Network of Excellence in Science (AGNES)

► <http://www.agnes-h.org>

Alexander von Humboldt Foundation: Heather Marco will continue to be the driving force behind the AGNES network in Africa

► <https://www.humboldt-foundation.de/web/50022942.html>

German Federal Ministry of Education and Research (BMBF): Middle East and Africa

► <https://www.bmbf.de/en/middle-east-and-africa-2279.html>

The World Academy of Sciences (TWAS)

► <https://twas.org>

Knowledge into Practice: The German African Innovation Incentive Award

Deutsche Zusammenfassung

Das Bundesministerium für Bildung und Forschung (BMBF) hat im Jahr 2017 erstmals den „Deutsch-Afrikanischen Innovationsförderpreis“ (German African Innovation Incentive Award – GAIIA) ausgeschrieben und vergeben. Der Preis honoriert herausragende Leistungen afrikanischer Forscher, die an afrikanischen Einrichtungen arbeiten und mit deutschen Forschungs- und Innovationsakteuren kooperieren. Die Verwendung des Preises erfolgt in gemeinsamen Anschlussprojekten, mit denen die Partner ihre Forschungsergebnisse im Hinblick auf eine künftige Nutzung hin weiterentwickeln. Die vier Preisträger aus dem Jahr 2017 kommen aus Ägypten, Nigeria, Kenia und Uganda. Für 2018 ist eine zweite Förderbekanntmachung geplant, eine Verstärkung der Förderung wird geprüft.



Dr Ralf Hermann
Head of German Office for International Cooperation in Vocational Education and Training (GOVET) Federal Institute for Vocational Education and Training (BIBB) Bonn, Germany

In his previous position, Ralf Hermann had responsibilities for the management of the German African Innovation Incentive Award at the DLR Project Management Agency

In 2017, the German Federal Ministry of Education and Research (BMBF) launched the “German African Innovation Incentive Award” for the first time. The award responds to the increasing acknowledgement of research as a driver of societal development in the transformative policies of African countries. It honours excellent research outcomes in Africa and is, at the same time, destined to support their entrepreneurial valorization or their use for solutions for the common good. As an additional objective, the BMBF wishes to enable German researchers and institutions to conduct collaborative projects with African partners. It intends, thereby, to promote research collaboration as a domain of particular effectiveness in an impact orientated cooperation policy and as a centerpiece of the overall German cooperation portfolio with African countries. This is in line with the German Federal Government’s strategy “Internationalization of Education, Science and Research” (2017) and the BMBF’s “Africa Strategy 2014-2018”.

The award is bestowed on an African researcher with affiliation to an institution in Africa and her or his German partner in an upcoming project. Basic nomination requirement is an excellent outcome of prior research or innovation projects in combination with a convincing plan for mid-term utilization or valorization. The award supports the next step towards the ultimate transfer of knowledge into solutions.

Criteria for selection relate to a set of guiding principles. First, the advancement of previous research towards transfer and application needs to be evident in the content and goals of the upcoming project, including a vision for actual implementation beyond the funding period. This includes that projects should be responsive to societal challenges and that they pursue sustainable objectives. At best, a structural impact, e.g. by establishing spin-offs, start-ups, incubators or application oriented research units, is already outlined as an outcome of the project. Thereby, effects on employment can be envisaged, in the research system itself or in economic activities triggered by the project and including extra-mural stakeholders. Ultimately, the award wants to contribute to the advancement of knowledge societies in the partner countries. The potential for replication of project outcomes in the partner country or in third countries in Africa adds value to proposals.

While the award expressly aims at a developmental impact in the African partner country, it differs essentially from both traditional development cooperation and mere export initiatives. Rather than offering ready-made solutions, proposals shall set out how the projects generate the intended results through a collaborative process of partners with equal

In Brief: Bilateral German African knowledge transfer projects based on previous successful research, funding amount 150,000 EUR, regular funding period two years

2017 Award winners and projects:

Dr Tarek Metwally Khalil (German University in Cairo, EGY) + Prof Ursula Eicker (Stuttgart University of Applied Sciences – HFT): The Adaptability of PhotoVoltaic-Thermal Collectors to Increase the Share of Renewable Energy Production for Heating-, Cooling-, and Electric-Energy in Systems of Buildings
Dr ing Kolawole Adisa Olonade (Obafemi Awolowo University, Ibadan, NGA) + Dr Wolfram Schmidt (Fed. Institute for Material Testing – BAM, Berlin): Low-Carbon Livelihoods - Cassava residues for performance materials

Dr Isaiah Etemo Muchilwa (Moi University, Eldoret, KEN) + Prof Oliver Hensel (University of Kassel): Innovative cereal drying and handling technology to combat aflatoxin contamination in Kenya's maize supplies

Dr. Angella Musiimenta (Mbarara University of Science and Technology, UGA) + Prof Niels Pinkwart (Humboldt University Berlin): Using a mobile phone-based multimedia technology to support maternal health in rural southwestern Uganda

responsibilities. This introduces the second guiding principle. Partnership at eye level is, despite structural disparities in the realization of joint North-South projects, the very model of cooperation in the field of research and innovation. Consistently, a main criterion for funding is a cooperation design based on symmetric roles of the partners. In practice, the award will be granted to the African researcher and his or her German partner only if each of them plays an equivalent

role in a peer-to-peer project. On the German side, experience in the cooperation with African partners and commitment to co-ownership is required to ensure compliance with this model of cooperation. For administrative reasons, the German institutional partners initially receive the funds and transfer at least half of them to the African side. The German institutions must verifiably focus their entire project activities on the aforementioned goals in the partner country.

The range of topics is not strictly limited. However, the award highlights subject areas of particular demand for problem solutions in African countries. Therefore, the first call expressly mentions the areas

of environmental sciences, health research, bio-economy, societal development (in particular socially responsible business practices, social innovations, sustainability concepts), resource management (in particular exploitation of locally available resources, resource efficiency, sustainability), and ICT. The award encourages research that develops and adapts technologies to local contexts and, in the long run, aims at the development of products for economic valorization in and by Africans. It equally welcomes research for social and process innovation with a convincing prospect of actual implementation. After the nomination of an African award candidate by a German partner or by herself/himself, the report on previous projects and a joint project proposal are reviewed, firstly, under cooperation policy (symmetry) and non-subject specific criteria (transfer) and, secondly, by independent peers under scientific criteria. The final decision is made by an independent jury of high-rank experts, representing matching competencies in international cooperation and in research and innovation policy.

The award is understood as a complementary measure to indigenous African initiatives such as the Innovation Prize for Africa of the African Innovation Foundation. The BMBF intends to publish a second pilot call in 2018. Provided that the first two pilot rounds of funding are successful, the BMBF intends to reiterate the call.



Further Information

Deutsch-Afrikanischer Innovationspreis erstmals vergeben (in German)

► <http://www.kooperation-international.de/aktuelles/nachrichten/detail/info/deutsch-afrikanischer-innovationspreis-erstmal-geben/>

Call Text BMBF

► http://www.internationales-buero.de/media/content/BMBF_Call_German-African_Innovation_Award.pdf

Innovation Prize for Africa

► <http://innovationprizeforafrica.org>

African Innovation Foundation

► <http://africaninnovation.org>

Pan-African and Cross-Border Initiatives for Building up Science and Innovation Capacities

The Train the Trainer System – A Chance for the Further Education of VET-Pedagogues in Sub-Saharan Africa

Deutsche Zusammenfassung

Internationale wirtschaftliche Konkurrenzfähigkeit verbunden mit sozialverträglicher Arbeitsgestaltung stellt die Berufsbildung und die berufsbildenden Lehrkräfte weltweit vor neue Herausforderungen. In mehreren Projekten in Subsahara-Afrika hat sich gezeigt, dass dem nicht allein mit neuen Konzepten für die Berufsschullehrererausbildung begegnet werden kann. Es müssen vor allem auch jene Dozenten und Lehrkräfte einbezogen werden, die bereits in den Universitäten, Schulen und Unternehmen tätig sind. Sie bedürfen der Kompetenz, selbst den Aufbau und Betrieb eines eigenen Fortbildungssystems in die Hand zu nehmen und zeitgemäße Lehr- und Lernkonzepte entwickeln und umsetzen zu können. Im DAAD geförderten Projekt VET-Net (Forschungs- und Fortbildungsnetzwerk für Berufspädagogen in Subsahara-Afrika, Laufzeit: 2012 bis 2015) haben die Universitäten Rostock und Siegen mit Partnern der Universidade Pedagógica in Mosambik, der University of the Witwatersrand in Südafrika und der Jimma University in Äthiopien ein Train-the-Trainer-Konzept (TtT-Konzept) entwickelt, mit dem die Fortbildung der berufsbildenden Lehrkräfte in Subsahara-Afrika systematisch angeboten werden kann.



Dr Gesine Haseloff
Research Assistant
Chair for Didactics of Technical
Vocational Education
University of Siegen
Siegen, Germany

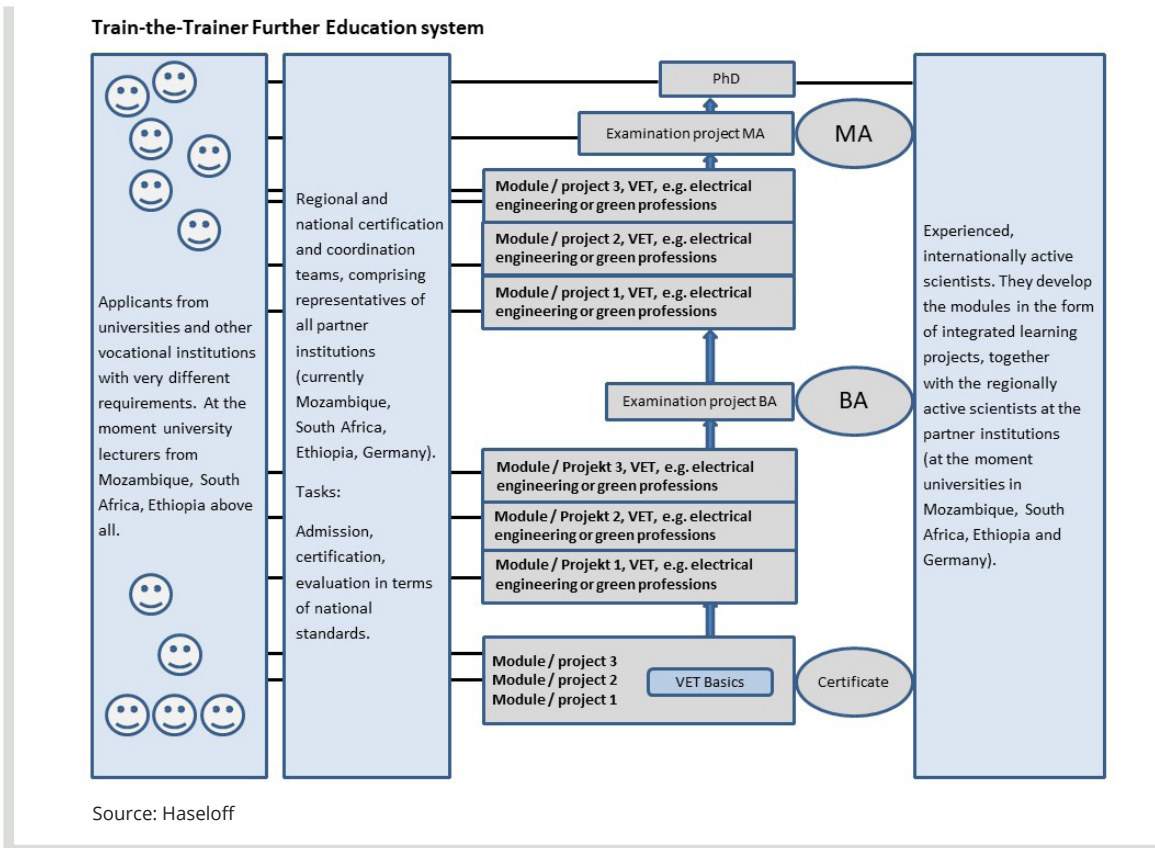
competitiveness combined with socially acceptable working practices. It is not enough to just develop new concepts for the initial training of VET professionals. This has been demonstrated in several projects in Sub-Saharan Africa. Above all, it is also necessary to involve those VET professionals who are already working in universities, schools and companies. They need the competence to set up and operate their own further education system and to develop and implement modern shaping oriented teaching and learning concepts.



Prof. em Dr. Friedhelm Eicker
Senior Advisory Board
Chair for Didactics of Technical
Vocational Education
University of Siegen
Siegen, Germany

It became clear in the mentioned projects that further education should be offered to university lecturers at first. So they can start to educate the VET professionals in schools and companies in the second step. In the third step, the apprentices (future skilled workers) will be educated. In the VET-Net project (Research and Further Education Network for VET professional pedagogues in Sub-Saharan Africa, 2012-15), the Universities Rostock and Siegen developed a Train the Trainer (TtT) system together with the Universidade Pedagógica in Mozambique,

Vocational Education and Training (VET) and the VET professionals are facing new challenges worldwide in terms of international economic



the University of the Witwatersrand in South Africa and the Jimma University in Ethiopia. Funding was provided through the German Academic Exchange Service (DAAD). The TtT system received its first positive response at the Vocational Education and Development Symposium in Windhoek, Namibia, in August 2016 (supported by the Volkswagen Foundation), which invited to reflect on the development of further education in Vocational Education and Training in Sub-Saharan Africa.

The Situation

In Mozambique, Ethiopia and South Africa there were no opportunities for VET professionals for systematic further education. The universities did not see this as their task. Accordingly, faculty members had little relevant teaching, research and development skills for the training of VET staff. A transnational and internationally embedded dialogue on vocational education and training of VET professionals was imperceptible.

The universities problematized that university lecturers in vocational education were usually only

technically or only pedagogically trained. In order to change the situation in the VET-Net project, the (project involved) university lecturers aimed to achieve the most direct and concrete research / development and teaching competences possible. After fundamental discussions, they opted for a (constructivist-ly oriented) path with an orientation in vocational / occupational sciences.

On this basis, the African partners were able to acquire a first competence to shape a training concept. For this purpose, "shaping" was to be identified in its essential constituent features: as a net-worked interaction of the different vocational learning venues or the VET professionals, who jointly identify relevant work tasks, transfer them into teaching / learning or research / development tasks and then solve them.

Every partner could bring their special potential into the "common cause". Possible alternatives have always been considered and taken into account in a well-founded way. The joint efforts were reflected in the design, construction and initial operation of the highly flexible TtT system.

The TtT system – a plea for “highly flexible” shaping-competence-oriented and networked training

It is proposed to further develop and test the TtT system outlined below in Sub-Saharan Africa. In the TtT system, the learners (VET Professionals) can complete a module depending on personal requirements by shaping a suitable learning project. They learn working process-accompanying. The learning project is conducted under university leadership – networked – with practice partners in colleges / vocational schools, companies and other vocational work and study locations. With each module / learning project, learners (VET Professionals) can progress (to Bachelor, Master and PhD degrees). Basic learning projects are offered to the learners (VET Professionals) with very low levels of competence or one-sided competence. The respective learning success entitles to participate in an advanced learning project.

The benefits of building and using the TtT system

1. The underdeveloped education of VET professionals is promoted.
2. The training system or training is shaping-oriented and encourages to work in a network and with alternative ways (to develop the further education VET system).
3. There is a direct focus on work (process) oriented and demanded teaching and learning.
4. The training refers to the possibilities in the universities, colleges / vocational schools, companies and other work or training places and on the individual needs of the VET professionals.
5. The VET professionals can gain flexible training in terms of time and topic – work / professional life – in modules / learning projects and acquire degrees at various levels.
6. Systematic and holistic learning, in which constructive and interlocking learning projects are included and offered in the modules – which correspond to occupational scientific insights with an integrative consideration of individual scientific / professional insights; and in which not only “theoretical” knowledge is imparted, but also related “practical” skills.
7. The pivotal points in the TtT learning projects are learning tasks that the VET professionals solve largely independently with the help of their lecturers. Thus, the VET professionals gain competence to shape their “work processes” (mostly tuition in the vocational school, the company, university or college).
8. The content of the TtT system is open – the learning projects are provisionally named, described and substantiated and are constantly being developed further.
9. The networked interaction ensures an international standard.
10. Regional (operational and social) expectations are met in the context of supra-regional / international demands.
11. The VET professionals are trained to become co-creators of “their” training system.



Further Information

Vocational Education and Training in Sub-Saharan Africa (book publication)

▶ <http://www.wbv.de/artikel/6004570w>

List of publications

▶ <http://eicker-bbw.de/index.php/ab-2010.html>
 ▶ <http://www.tvd-edu.com/publikationen-dr-haseloff.html>

List of projects

▶ <http://eicker-bbw.de/index.php/projekte.html>

German Academic Exchange Service (DAAD)
Country Information Africa (in German)

▶ <https://www.daad.de/laenderinformationen/afrika/de>

The Partnership for Skills in Applied Sciences, Engineering and Technology (PASET)

Deutsche Zusammenfassung

Die „Partnership for Skills in Applied Sciences, Engineering and Technology“ (PASET) wurde im Jahr 2013 von afrikanischen Regierungen gegründet. Hintergrund ist der afrikanische Mangel an gut ausgebildeten Fachkräften in den angewandten Wissenschaften, Ingenieurwissenschaften und Technologien. Das Sekretariat ist bei der Weltbank angesiedelt. Ziel ist es, mit Hilfe eines neu aufgelegten Stipendienprogramms „Regional Scholarship and Innovation Fund“ (RSIF) die wissenschaftlich-technische Ausbildung und Innovationskraft in Afrika zu verbessern. Seit 2016 können sich afrikanische Hochschulen außerdem an einer Benchmarking-Initiative beteiligen. Weitere Aktivitäten sind im Bereich Berufsbildung geplant. Der Teilnehmer- und Unterstützerkreis für PASET wächst derweil weiter. An PASET-Treffen zum Wissensaustausch haben sich bereits 26 Länder aus Subsahara-Afrika beteiligt. Besondere Unterstützung leisten Äthiopien, Senegal, Ruanda, Kenia und die Elfenbeinküste. International zählen China, Indien, Brasilien und Südkorea zu den Förderern. Forschungsinstitute und private Organisationen haben ebenfalls Interesse an einer Unterstützung bekundet.



Prof. Aminata Sall Diallo
Executive Director of PASET
Executive Committee
Special Advisor to the Minister of
Higher Education, Research and
Innovation of Senegal
Dakar, Senegal

Despite having one of the world's fastest growing youth populations and a large supply of natural resources, Sub-Saharan Africa (SSA) faces a daunting skilled labor deficit. One indicator of how far it lags behind is in scientific research and development, where it contributes just 1.1% of global research output.

However, the development experiences of China, India, Korea and some Latin American countries show us that huge investments in education, particularly in science and technology fields, are imperative to fight modern economic challenges. For African countries, there is no better time than now to accelerate skill development in applied sciences, engineering and technology (ASET) fields.

The Partnership for skills in Applied Sciences, Engineering and Technology (PASET) was borne out of this diagnosis. While many regional and global

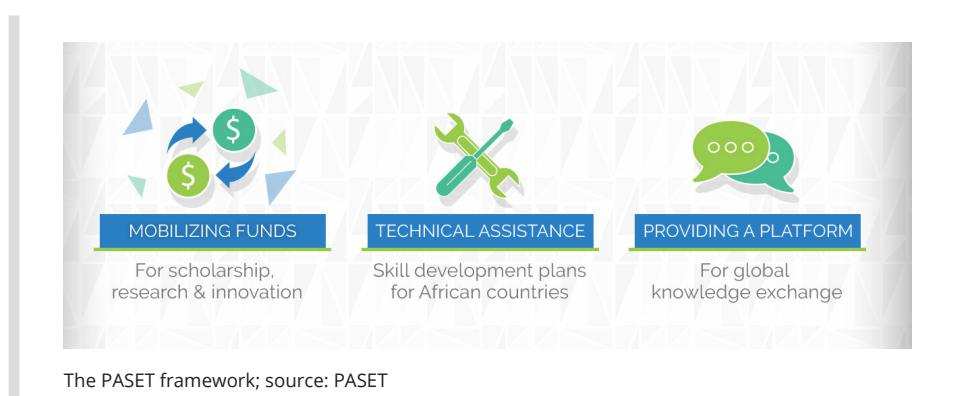
initiatives focus on primary education, there was no similar platform for higher and technical education in science and technology fields. PASET was launched in 2013 by African governments to address this, by building a continuum of technical and scientific competencies from upper secondary, technical and vocational levels to higher education and research in ASET fields.

PASET convenes African governments, private sector, and traditional as well as new development partners to jointly build its human capital in priority economic sectors, like communication technologies, transportation networks, energy, industrial development and ecosystem management.

What do we aim to achieve, and for whom?

From African university faculty and would-be researchers to ASET university programs, Technical and Vocational Education and Training (TVET) centers, African governments, their partner countries, and the private sector – PASET's beneficiaries are diverse.

In the medium-term, PASET aims to contribute toward training at least 10,000 new PhD holders in ASET fields by establishing a pan-African post-graduate scholarship program. It also targets doubling the number of ASET students in at least ten SSA countries, and the development of high quality ASET



programs in at least five universities. Further goals include the development of at least five regional TVET centers to train faculty in emerging areas and enable resource sharing/quality assurance; a regional quality assurance mechanism for ASET programs; and high quality data systems and benchmarking of such programs in at least ten SSA countries.

PASET will achieve its goals through a three-pronged framework, as follows:

- **Mobilization of funds for scholarship/innovation:** In this category, PASET operationalized a Regional Scholarship and Innovation Fund (RSIF) in 2017 (see box on next page).
- **Technical assistance:** In this area, PASET launched a Regional Benchmarking Initiative for Universities in 2016, which helps ASET focused institutions improve the quality and relevance of their programs by identifying their strengths and weaknesses, and assessing and monitoring their progress relative to similar global institutions. Sixty African universities are already participating in the initiative. In addition, PASET is helping African governments develop their own ASET skills development plans to mobilize funding from various partners.
- **Knowledge-sharing:** Through its forums, workshops and exchange visits, PASET helps African countries learn about global best practices and adapt experiences of other countries to their own needs. Its events also make a strong case to governments, private sector and development partners for greater investment in capacity building in ASET fields. About 26 SSA coun-

tries have participated in PASET's knowledge sharing activities, such as the 4th PASET Forum.

An inclusive governance structure

PASET's governance structure includes a Board of Directors comprised of African ministers and other contributors to PASET activities, and an Executive Committee comprised of technical experts to guide its functioning. Currently, the Governments of Senegal, Rwanda, Ethiopia, Kenya, and Côte d'Ivoire serve on the Board as they have made firm commitments to the RSIF along with the Korean Development Institute. They are joined by the World Bank, which hosts PASET's Secretariat, provides technical assistance, and manages trust funds supported by the Governments of Korea and China.

PASET also has a Consultative Advisory Group comprised of eminent scientists and academic leaders from Africa and abroad. Several private sector, international development organizations and research institutes have expressed interest in providing it financial and in-kind support, and its knowledge initiatives have received support from institutions in China, India and Brazil.

A model for other regional development initiatives

PASET's approach sets it apart from many existing development initiatives in Africa. First and foremost, it is a pan-African initiative marked by strong regional ownership. The PASET RSIF is funded by African governments, targeting a broader range of disciplines that are all selected by these governments based on their development priorities. Each of its initiatives is

anchored in Africa, making sustainability much more likely.

Second, compared to most education initiatives that tend to have a narrower focus, PASET focuses on building an entire continuum of skills in both higher education and technical and vocational education and training. And last but not least, it engages with diverse partners in both the public and private sector at the same level of commitment – gaining unique leverage.

In April 2017, in his message to the 4th PASET Forum in Nairobi, Kenya's President Uhuru Kenyatta appealed to all African countries to pay greater attention to scientific and technical skills to speed up the continent's industrialization and growth. „PASET is the beginning of an answer. It sharpens our skills in the applied sciences, engineering and technology – especially among graduates of our technical and vocational training institutions, and our universities. Kenya is glad to be one of the beneficiaries of PASET.“

Like President Kenyatta and my own country's leadership, I too believe that PASET contains our answer for transforming our continent's technical-scientific capability. We hope many more governments and international and private sector organizations will join us in this exciting effort.

The Regional Scholarship and Innovation Fund (RSIF) mobilizes funds from governments and other partners. RSIF provides PhD training as well as research and innovation grants to African university faculty and young scientists and researchers. Selection of the first RSIF host and international partner universities has been completed and selection of its first PhD cohort is now underway. In addition, PASET has a regional initiative in the pipeline to support technical and vocational education/training in priority sectors.



Further Information

World Bank: Partnership for Skills in Applied Sciences, Engineering and Technology (PASET)

► <http://www.worldbank.org/en/programs/paset>

Brief: Partnership for Skills in Applied Sciences, Engineering and Technology (PASET)

► <http://documents.worldbank.org/curated/en/2016/06/26469967/partnership-skills-applied-sciences-engineering-technology-paset>

PASET Regional Scholarship and Innovation Fund

► <https://www.rsif-paset.org>

World Bank: African Centers of Excellence (ACE)

► <http://projects.worldbank.org/P126974/strengthening-tertiary-education-africa-through-africa-centers-excellence?lang=en>

PASET Regional Benchmarking Initiative to strengthen African Universities

► <http://documents.worldbank.org/curated/en/215061468181132396/The-PASET-regional-benchmarking-initiative-to-strengthen-African-universities>

PASET Fourth Forum (May 2017): New Ideas, Partnerships Forged for Building a Skilled African Workforce

► <http://documents.worldbank.org/curated/en/982271496828868021/4th-Paset-forum-partnerships-and-innovation-skills-development-in-Africa>

PAUWES: The Pan African University Institute of Water and Energy Sciences (Including Climate Change)

Deutsche Zusammenfassung

Das Konzept einer panafrikanischen Netzwerkuniversität für Studium und Forschung im Postgraduiertenbereich wurde durch die Konferenz der afrikanischen Forschungsministerinnen und -minister entwickelt. Im Jahr 2010 wurde beschlossen, thematisch fokussierte Institute in fünf Ländern einzurichten, die über die afrikanischen Großregionen verteilt sind: Algerien (Nordafrika), Nigeria (Westafrika), Kamerun (Zentralafrika), Kenia (Ostafrika) und Südafrika im südlichen Afrika. Das „Pan African University Institute of Water and Energy Sciences (including Climate Change)“ (PAUWES) in Algerien wird als Gemeinschaftsprojekt der Afrikanischen Union sowie der deutschen und algerischen Regierung aufgebaut. In den bisherigen zwei Abschlussjahrgängen waren Studierende aus 26 Ländern vertreten. Sämtliche Studierende erhalten ein Vollstipendium. Im Gegenzug sind sie verpflichtet, nach ihrem Abschluss entsprechend der Dauer der Förderung für eine afrikanische Regierung zu arbeiten. Der Aufbau von Forschungskapazitäten in PAUWES erfolgt mit Hilfe des Bundesministeriums für Bildung und Forschung (BMBF).



Prof Dr Abdellatif Zerga
Director
Pan African University Institute of
Water and Energy Sciences, including
Climate Change (PAUWES)
Tlemcen, Algeria

Interview with Abdellatif Zerga

ITB: What is the rationale behind the foundation of the Pan African University?

Abdellatif Zerga: The first African Ministerial Conference on Science and Technology held in Johannesburg, South Africa, in 2003 undertook to improve the quality of science and technology education. Consequently, the Pan African University (PAU) was seen as a necessary conduit to improve the quality of science education. A concept note was thus developed for the creation of PAU in 2008. The concept note outlined the objectives of the PAU that include developing “world class researchers” in areas considered essential to Africa’s productivity. The PAU also seeks to provide teaching and to improve research at post-graduate level. A decision by African heads of state to endorse the allocation of five campuses of the Pan African University (PAU) to Algeria, Cameroon, Kenya,

South-Africa and Nigeria was made in 2010. This paved way for the creation of curricula for the PAU, which will offer courses at PhD and master’s level.

ITB: PAUWES has been operational since 2014. What have been the main achievements so far, what are the challenges?

Abdellatif Zerga: Since its early operation, PAUWES has been able to bring two master cohorts to graduation, covering 26 different countries. Several events such as international symposia, fora, fairs and exhibitions, Pan African and international summer schools, have been organized at PAUWES. PAUWES has also initiated various collaborations worldwide, thus building a true network of socio-economic value. Jointly with African and international actors PAUWES and with the support of the German Federal Ministry of Education and Research (BMBF), is involved in many research projects jointly to address the issues of water and energy security in the continent.

Regarding the challenges, the main one is to push African students get over their traditional thinking and behaviour, take away the selfish thinking, and start to think more widely, in terms of “benefiting everyone”, “benefiting Africa”. Another challenge is to see all graduate students securing important jobs and key positions within Africa.

PAUWES – Pan African University Institute of Water and Energy Sciences (including Climate Change)

The current funding situation at PAUWES is based on a trilateral agreement between the Algerian government, the African Union and the German government as key thematic partner of the institute. The Algerian government through the Ministry of Higher Education and Scientific Research (MERS) and the university Tlemcen hosting the PAUWES are providing core staff, expertise, student services and equipment evaluated to 12 million Euro. The African Union Commission (Human Resources, Science and Technology) is covering the operational budget, the salary of the director and top ups for staff. The German Federal Ministry of Economic Cooperation and Development (BMZ) through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is supporting onsite all processes related to the institutional development with a focus on teaching, public private partnership and cooperation with institution of higher education in Germany. The BMZ through the Kreditanstalt für Wiederaufbau (KfW) is also supporting the payment of students' stipends, short term lecturers and infrastructures. The BMZ contribution through GIZ and KfW is estimated at 41 million Euro for the support of the rectorate respectively PAU and PAUWES as institute. The German Federal Ministry of Education and Research (BMBF) is supporting the research dimension of the institute with 3.5 million Euro through several projects with PAUWES involvement allowing also PAUWES students to conduct a PhD.

Further challenges related to the institutional development of PAUWES which are currently addressed are the recruitment of outstanding researchers, the equipment of laboratories with modern infrastructures.

ITB: Two cohorts of students have graduated at PAUWES, so far. In your opinion, how will the PAUWES graduates be able to contribute to the development of their home countries and the African continent?

Abdellatif Zerga: PAU offers full scholarships to all students enrolled in its programmes.

In the scholarship agreement, PAU students are required to make an undertaking to serve any African Union Member State for a period equal to at least the duration of the scholarship. I believe all of these students have received considerable training in terms

of creativity, entrepreneurship, adaptation in both engineering and policy fields. Those are valuable tools not to underestimate. As such, it becomes up to them to shape their lives accordingly and contribute the development of their regions by having a positive active thinking, instead of being passive and waiting for others to offer them jobs.

ITB: Together with the BMBF, PAUWES has developed a research agenda for the institute. What will be the role of research at PAUWES?

Abdellatif Zerga: Research is a mean to bring solutions to a problem, or to improve a not too adequate but already existing solution. Consequently, research at PAUWES is and will remain of high importance in order to seek real and definite solutions to the major problems in Africa, i.e. water shortage, irrigation and energy shortage. The BMBF and PAUWES launched the research agenda process in 2015. Since then, African and German scientists have worked together to develop recommendations for the research agenda of PAUWES. The research agenda consists of recommendations aiming to:

- Identify relevant research areas and topics in the field of water, energy and climate change including their prioritisation for Africa.
- Identify needs regarding necessary infrastructural equipment as well as scientific and also research management capacities.
- Identify relevant stakeholders in science and research, government and research policy, economy and industry, and non-governmental organisations (NGOs).
- Identify potential instruments and tools for implementation.
- Create a scenario for the integration of PAUWES into international and global networks.
- Contribute to the optimum integration of education and research at PAUWES.

ITB: PAU is a network university. Could you explain the concept and how it is implemented by PAU?

Abdellatif Zerga: The concept is simple: The Pan African University have addressed five crucial thematic areas, through a network of five flagship institutes, namely Basic Sciences, Technology and Innovation; Life and Earth Sciences (including Health and Agriculture); Governance, Humanities and Social Sciences; Water and Energy Sciences (including Climate Change); and Space Sciences. The thematic areas are assigned to five institutes hosted by existing Universities of excellence across Africa's five geographic regions. These five institutes will work together and in coordination.

When fully deployed, each PAU thematic institute will be linked to ten Satellite centers with complementary thematic specializations, inter- and trans-disciplinary programs. At full operational capacity, the PAU will incorporate 50 centers of excellence under its five academic hubs across Africa.

ITB: For any new institution, securing structural and financial sustainability is a huge challenge. What is the strategy of PAUWES to meet this challenge?

Abdellatif Zerga: To ensure the quality and high standard at PAUWES, a core funding as operative budget is needed. Discussions are ongoing at the African Union, with the African Development Bank, the Algerian Ministry of Higher Education and Scientific Research and Germany to refine the funding model of the institute integrating the sustainability perspective of the institute.

In addition to that, PAUWES is betting on partnering with industries, companies, and entrepreneurial work to diversify the sources of funding. With the recruitment of international experienced researchers, project grants are also supposed to contribute to the financial sustainability of the institute. More so, PAUWES is working hard to become a center of excellence that will provide non-free services worldwide.

The interview was conducted by Dr Anja Köhler and Dr Stefan Wagener (DLR Project Management Agency).



Further Information

Pan African University

▶ <https://pau-au.net/en/home>

Pan African University Institute of Water and Energy Sciences (including Climate Change) PAUWES c/o Tlemcen University

▶ <http://pauwes.univ-tlemcen.dz>

African Union: Human Resources, Science and Technology

▶ <https://au.int/hrst>

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ): Supporting the Pan African University and establishing the Institute of Water and Energy Sciences (including Climate Change) (PAUWES)

▶ <https://www.giz.de/en/worldwide/26267.html>

German Federal Ministry of Education and Research (BMBF): Middle East and Africa

▶ <https://www.bmbf.de/en/middle-east-and-africa-2279.html>

United Nations University (UNU) Press Release: Water and energy security for Africa (WESA)

▶ <https://ehs.unu.edu/media/press-releases/water-and-energy-security-for-africa-wesa.html>

The African Institute for Mathematical Sciences (AIMS)

Deutsche Zusammenfassung

Im Jahr 2003 wurde das erste „African Institute for Mathematical Sciences“ (AIMS) für Studium und Forschung im Postgraduiertenbereich eröffnet. 15 Jahre später unterhält AIMS ein Netzwerk von Instituten in sechs Ländern Subsahara-Afrikas: Südafrika, Senegal, Ghana, Kamerun, Tansania und – seit 2016 – Ruanda. Seit der Gründung des ersten Zentrums haben bereits 1.500 Studierende aus 43 afrikanischen Ländern die Studien erfolgreich absolviert. Etwa ein Drittel davon sind Frauen. Verschiedene Programme zielen darauf ab, die AIMS-Studierenden mit der Industrie zu vernetzen. In fünf der sechs Zentren hat das Bundesministerium für Bildung und Forschung (BMBF) zusammen mit der Alexander von Humboldt-Stiftung (AvH) Forschungslehrstühle eingerichtet (German Research Chairs Programme). Das Flaggschiffprojekt AIMS wirbt durch die Beteiligung an der „Next Einstein Initiative“ auch für den Wissenschaftsstandort Afrika.



Prof Dr Barry Green
 Director of the African Institute
 for Mathematical Sciences (AIMS)
 South Africa
 Chief Academic and Research
 Officer for AIMS-NEI (Next
 Einstein Initiative)
 Cape Town, South Africa

In 2018 the African Institute for Mathematical Sciences (AIMS) celebrates its 15th year since opening. It has grown from the humble beginning as a single institute in Muizenberg, South Africa, admitting roughly 50 postgraduate diploma students in the mathematical sciences each year, to a pan-African organization with a network of centres, admitting between 250 and 300 Masters students annually. Its focus is training, research, public engagement and the development and showcasing of STEM work in Africa.

The students at AIMS centres are selected from a pool of more than 4,500 African graduates in the mathematical sciences. At each centre students are selected from all over Africa, creating a unique pan-African environment of young talent. The AIMS mission is to enable Africa's brightest students to flourish as independent thinkers, problem solvers and innovators capable of propelling Africa's future scientific, educational and economic self-sufficiency.

There are six AIMS centres: in South Africa, Senegal, Ghana, Cameroon, Tanzania, and recently Rwanda, which opened in 2016. AIMS' Next Einstein Initiative

is working to establish centres of excellence across Africa and it is the first pan-African network of centres of excellence in the mathematical sciences. The AIMS model prioritizes international-class education for Africa's most valuable resource, its young people, for the transformation of the continent. AIMS has graduated more than 1,500 students from 43 African countries to date, 32 percent of them being women.

AIMS students learn professional and employable skills, and are also trained in entrepreneurial methods to broaden their career preparedness for paths outside academia. This program, for which full scholarships are provided, is taught by world-class lecturers from both Africa and abroad in a continuous learning environment.

Dovetailing with this program, we have introduced the AIMS Industry Initiative. This initiative links the mathematical sciences to the needs of industry, focusing on eliminating the skills gap in Africa. There are two concrete programs. The first is a cooperative Masters degree program at our centre in AIMS Senegal, which is being extended to AIMS Cameroon and later to AIMS Rwanda. This program, funded by the MasterCard Foundation and the Canadian Government, seeks to enhance the competencies of our students and graduates by providing them with opportunities to gain real-world experience with international and local industry partners. The second is an Industry Immersion Program, which is expected to run for three years, and is offered together with the European School of Management and Technology (ESMT) in Berlin. A group of suitably qualified and industry-inclined AIMS Master's graduates from across Africa were given the opportunity to participate

in the 20-week residential and industry program. Funding for this program from the German Federal Ministry for Economic Cooperation (BMZ) through the German Academic Exchange Service (DAAD) as well as participating industry partners has made this possible.

The core AIMS training program is part of a broader project for development that also involves research, outreach, and public engagement. Thus, a key pillar of the institute's strategy is to produce high-quality research that addresses challenges in African development. Each centre is expected to engage in relevant, multidisciplinary research. The German Federal Ministry of Education and Research (BMBF) has contributed very significantly to this development by funding and establishing German Research Chairs at the centres in Senegal, Ghana, South Africa, Cameroon and Tanzania. The German Research Chairs, managed through the Alexander von Humboldt Foundation has been most successful attracting exceptional young scientists and the growth of strong collaboration with researchers in Germany and internationally. Along with each German Research Chair accompanying measures, such as university cooperation activities, PhDs and Postdocs are funded via the DAAD.

Through innovative pedagogical approaches, the use of technology, and curricula, the AIMS Teacher Training Programs focus on strengthening the mathematic capacity and professional development of teachers. These teachers can then provide as many school learners in Africa as possible, with a quality education in math and science, investing in the future thinkers who will lead Africa's development. The AIMS Schools Enrichment Centre (AIMSSEC) in South Africa has trained over 1,700 teachers with its Mathematical Thinking Course. The teacher-training program in Cameroon, supported by The MasterCard Foundation, will train 1,920 pre-service teachers and 1,200 in-service teachers over the next five years, reaching 1.7 million school children. A similar program is being planned in Rwanda.

AIMS is keenly aware that it has many partners with which to work and is part of a growing renewal in Africa. The Next Einstein Forum (NEF), an initiative of AIMS and the Robert Bosch Stiftung, was launched in 2013 as a platform to bring together relevant

stakeholders and policymakers – from the scientific and academic sector, governments, science funding agencies, industry, media, and civil society – to showcase Africa's remarkable progress in science. In collaboration with the Robert Bosch Stiftung and the government of Senegal, AIMS co-hosted the first NEF Global Gathering in March 2016 in Dakar, Senegal. The gathering brought together more than 1,000 global scientific and industry thought-leaders, political leaders, and young scientists to establish a clear roadmap of Africa's future transformation by leveraging science, technology and innovation. The next Global Gathering will be held in Kigali, Rwanda, in 2018.

The spirit of AIMS distinguishes it from other institutions; AIMS is more than just the math. The organization has a caring side, concerned with the development of people and the inspiration of empowerment through understanding. There are many challenges to overcome as AIMS continues to grow. The achievements to date, and the enthusiasm and support generated internationally are remarkable. Increased investment and more conducive education policy are needed throughout Africa for talented students to reach their potential – AIMS is proud to be part of this story.



Further Information

African Institute for Mathematical Sciences (AIMS)

► <https://www.nexteinstein.org>

AIMS: Our Partners (African Government Partners, Funding Partners, Policy Partners, Academic Partners, Industry Partners)

► <https://www.nexteinstein.org/our-partners/?lang=en>

German Research Chairs at the African Institute for Mathematical Sciences (AIMS)

► <https://www.humboldt-foundation.de/web/German-Research-Chairs.html>

The Next Einstein Forum

► <http://nef.org>

The Network of African Science Academies (NASAC)

Deutsche Zusammenfassung

Das „Network of African Science Academies“ (NASAC) wurde im Jahr 2001 als Konsortium unabhängiger afrikanischer Wissenschaftsakademien gegründet. Inzwischen umfasst es Akademien in 23 verschiedenen afrikanischen Ländern, die über die fünf Großregionen verteilt sind. Ziel von NASAC ist es, nationale Akademien zu stärken und für afrikanische Regierungen unabhängige wissenschaftsbasierte Politikberatung bereit zu stellen. Eine Vielzahl von privaten und öffentlichen Akteuren aus den Industrieländern unterstützt ausgesuchte Aktivitäten, darunter auch die deutsche Nationale Akademie der Wissenschaften Leopoldina. NASAC vergibt in kleinerem Umfang auch Fördermittel, so zum Beispiel durch das Programm „Leading Integrated Research in Africa for Agenda 2030“ (LIRA 2030), das mit schwedischer Hilfe grenzüberschreitende Forschungsarbeiten in Afrika finanziert.



Jackie Olang-Kado
Executive Director
Network of African Science
Academies (NASAC)
Nairobi, Kenya

The Network of African Science Academies (NASAC) was founded in 2001 as an independent consortium of science academies on the continent. Eleven years later, NASAC was registered in Nairobi, Kenya, as an International Non-Governmental Organization and was subsequently recognized by the Inter Academy Partnership (IAP) as the affiliate network for Africa. Currently, NASAC draws its membership from science academies in 23 African countries of Algeria, Benin, Botswana, Burkina Faso, Cameroon, Côte d'Ivoire, Congo Brazzaville, Ethiopia, Ghana, Kenya, Madagascar, Mauritius, Morocco, Mozambique, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.

Strategic Goal and Objectives

NASAC's overall aim has remained "to serve as an independent African forum that brings together academies of science in the continent to discuss science-related issues of common concern, to make joint-statements on major issues relevant to Africa and to provide mutual support to member academies". In order to realize this aim, the strategic objectives of the network include: facilitating the es-

tablishment of new national science academies and strengthening existing ones; promoting a scientific culture on the continent through collaboration and networking of various players in the science landscape; creating strong partnerships for the cause of science in Africa; and lastly, promoting credible and effective science communication among scientists and other stakeholders. All the foregoing is achievable, if the financial sustainability of the network is assured; this therefore constitutes the fifth strategic objective of NASAC.

Instruments for delivery

NASAC's membership consists of duly established national science academies in Africa that are merit-based, independent, non-governmental, non-political and non-profit scientific organizations. In striving to remain both globally relevant and locally effective NASAC uses networking as the first instrument to guarantee that science academies lend their voices collectively to pertinent issues affecting the continent. Through networking academy mentorship and peer-learning among experts is fostered.

The second instrument is the academies' convening power. This makes it possible for NASAC and its members to host conferences, workshops and expert-panel meetings regularly with relevant stakeholders from government, academia and the private sector. These avenues to convene enhance the science-policy dialogues and provide opportunities for science to offer credible advice on various national policies or policy frameworks. The convening power of academies has facilitated the organization

of the Annual Meeting of African Science Academies (AMASA) conference series over the past 13 years tackling various thematic issues.

The third instrument, which specifically targets policy and decision-makers in Africa, is the policymakers' booklets on topical issues. The booklets allow experts from science academies to provide credible information and offer evidence-informed advice to decision and policymakers. For the booklets, NASAC serves as an archiving body with readily available information on the recommendations from African scientists to policymakers on specific thematic issues.

The fourth instrument are the standing committees or working groups, which serve as an avenue to underpin the academies' intellectual contribution to thematic areas such as science education programme (SEP), women for science (WfS), water, food and nutrition security and agriculture (FNSA). The members of these committees or groups are drawn from the fellows of member-academies through a nomination process.

Lastly, the fifth instrument that NASAC uses to deliver on its mandate is the provision of grants for early career researchers to undertake integrated research, and for science academies to enhance their operational capacities in-country. The grants are awarded competitively and for collaborative research or activities that involve more than two African countries through universities or academies.

Funding Sources

NASAC currently operates a lean secretariat based in Nairobi, Kenya, and executes its activities Africa-wide through the support of its members' secretariats. This overarching support to NASAC is provided in-kind by its members. For specific programmatic activities, financial support is mostly contributed by various funding agencies and partners in the form of grants secured through project or programme proposals. Since its inception, UNESCO through the Inter Academy Partnership (formerly Inter Academy Panel) has provided support for NASAC's annual work-plan. Additional support for specific programmatic activities and deliverables through the years have come from: The Bill and Melinda Gates Founda-

tion through the United States National Academies of Sciences for a ten-year programme on academy development, Pfizer Pharmaceutical Company through the Royal Society of the United Kingdom, the Dutch Ministry of Foreign Affairs, the Royal Dutch Academy of Arts and Sciences (KNAW), the French Academy of Sciences, the German Ministry of Education and Research (BMBF) through the German National Academy of Sciences Leopoldina and others. Through this programmatic support and for specific outputs, NASAC has been able to fund the deliberations of think-tanks through working groups, expert panels, editorial teams and various committees. Additionally, a modest Endowment Fund has also been set up to address longer term sustainability of the network.

Focus, challenges and lessons

NASAC's regional focus is to provide evidence-informed and scientifically-sound advice to policymakers on the continent through science academies. In focusing on Africa and science advice, NASAC is able to champion the partnership between academia and government, or academia and society, or both. After all, the government and society are key players in economic development and science must be relevant to their needs. The main challenge therefore has been how to simplify and demystify science so that it can accurately speak to both policy and livelihoods.

Specifically for early career researchers, starting 2016, the Swedish International Development Agency (Sida) is supporting a five-year programme implemented by NASAC in partnership with International Council for Science (ICSU) and its Regional Office for Africa (ROA), and the International Social Science Council (ISSC). The program, dubbed LIRA 2030 (Leading Integrated Research in Africa for Agenda 2030), aims to generate solutions-oriented knowledge required to address complex sustainability challenges in Africa and increase the participation of the African scientific community in global research programmes. This programme targets to provide a total of thirty grants to young scientists undertaking integrated research in two or more African countries and is awarded through the national universities or research institutes of the grantees. The grants are worth ninety thousand Euros for two-year projects.

Another challenge is the language-barrier in the continent. Africa is a continent of many ethnic cultures but predominantly the official languages are English, French, Arabic and Portuguese, with only Equatorial Guinea using Spanish. That means that using English as the official language of NASAC with occasional French translation in publications or interpretation in events, effective communication is limited especially when linking science advice to relevant policy making frameworks.

The vast geographical space of the continent also calls for expansive operations and resources network. This poses a challenge for scientific mobility and exchanges. Immigration difficulties between countries translate to costly travel, and hence limited movement of scientists within the continent.

Securing political goodwill that may lead to sustainable financial support for science, scientists and scientific institutions is also difficult. It is for this very reason that most science academies are still not well resourced or fully capacitated to fulfil their mandate as advisors to their nations. Home-grown commitment that translates to financial resourcing for academies has remained to a greater extent illusive.

All-in-all, Africa still needs to address sustainable development as one continent with the voice of science being heard. Arbitral barriers and sub-divisions of the continent either on spatial or linguistic basis does a disservice to the continent. In spite of the challenges, science must stay the course of uniting the continent and fostering societal well-being.



Further Information

Network of African Science Academies (NASAC)

► <http://nasaonline.org>

German National Academy of Sciences Leopoldina: Cooperation with NASAC

► <http://www.leopoldina.org/en/international-issues/international-partner-academies/leopoldina-cooperation-with-nasac/>

International Council for Science: Leading Integrated Research in Africa for Agenda 2030

► <https://www.icsu.org/what-we-do/funding-programmes/leading-integrated-research-for-agenda-2030-in-africa>

Swedish International Development Agency (SIDA)

► <https://www.sida.se/English/>

The Science Granting Councils Initiative (SGCI) in Sub-Saharan Africa

Deutsche Zusammenfassung

Die „Science Granting Councils Initiative in Sub-Saharan Africa“ (SGCI) wurde im Jahr 2014 gegründet, um die Kapazitäten von Wissenschaftsförderorganisationen in Subsahara-Afrika zu stärken. Die SGCI Initiative wird derzeit durch das britische Ministerium für Entwicklungszusammenarbeit (DFID), die kanadische Förderorganisation „International Development Research Centre“ (IDRC) sowie die südafrikanische „National Research Foundation“ (NRF) finanziert. Ziel ist es, den Austausch und das gegenseitige Lernen bei der Förderung voranzubringen und Partnerschaften unter den Förderorganisationen zu bilden. Bisher hat die Initiative Organisationen aus 15 Ländern mit drei verschiedenen Amtssprachen (Englisch, Französisch, Portugiesisch) zusammen gebracht. Vor Ort arbeitet die Initiative eng mit regionalen Organisationen wie der „Southern African Research and Innovation Management Association“ (SARIMA), aber auch mit Think Tanks wie dem „African Technology Policy Studies Network“ (ATPS) zusammen. Im Dezember 2017 wurde die SGCI-Initiative von der südafrikanischen Wissenschaftsministerin Naledi Pandor mit einem „Science Diplomacy Award“ geehrt.



Dorothy Ngila
Project Specialist: Strategic Partnerships
Strategy, Planning and Partnerships
National Research Foundation
Pretoria, South Africa

Developments throughout Sub-Saharan Africa (SSA) over the last ten years suggest a changing landscape, where science, technology and innovation (STI) are emerging as key drivers in social and economic development. These changes include increasing cases of collaboration on transboundary research, increases in the rate of scientific production and innovation activities, and the emergence of public organisations that fund STI. While progress has been slow, there is a discernible upward trend in the budgetary allocations to research and development (R&D) following the 2007 Abuja declaration for African governments to invest 1% of GDP in R&D.

Despite these positive trends, STI landscapes across developing regions still suffer from a number of challenges, including low capacities in research and research management. Publicly funded science granting councils (SGC) are central to the coordination and disbursement of public finances, and in catalysing research and innovation across Africa.

A 2013 scoping study in 17 SSA countries underscored the increasingly important role of these intermediary actors in national science systems. The study also identified a set of interrelated challenges facing these systems, including inadequate funding, uncoordinated roles, and limited capacities. At the same time, the National Research Foundation (NRF) recognises the critical role of effective and efficient partnerships for the success of any agenda to internationalise the research platform. These partnerships, when effective can add significant value if leveraged to implement multi-year, multi-country strategic programmes intended for long term institutional capacity strengthening. This approach formed the premise in developing the Science Granting Councils Initiative in Sub-Saharan Africa (SGCI).

The SGCI

The SGCI is jointly funded by the United Kingdom's Department for International Development (DFID), Canada's International Development Research Centre (IDRC), and the NRF. The SGCI aims to strengthen the ability of publicly funded Science Granting Councils to: 1) manage research, 2) design and monitor research programmes based on the use of robust STI indicators, 3) support knowledge exchange with the private sector, and 4) establish partnerships with other science system actors. These objectives are achieved through a number of modalities including customized regional exchange and training, regional forums, on-line training, individualised on-site mentoring, and collaborative research, with a robust monitoring, evaluation and learning framework.

More effective African SGCs will strengthen national science systems, and ultimately lead to nationally-led research that contributes to development in participating countries.

Bringing a diversity of structures, mandates, institutional cultures, and experiences across the thematic areas of the SGCI, formal and informal experiential knowledge, processes, and human resource exchanges have been facilitated through the SGCI across the 15 participating councils. Topics such as research excellence, merit review, effective partnership building, strategic investments in research and innovation in Africa, amongst others, have formed a basis for robust discussions and deep learning amongst the SGCs.

Additionally, the SGCI has adopted an approach where implementation modalities are technically supported by eleven collaborating technical agencies, who collectively represent a significant portion of the scientific knowledge base of Africa within the SGCI thematic areas.

Partnerships with the SGCI

The initiative has leveraged the strengths of the funders, granting councils' and technical expertise partnerships to additionally profile and support networked science granting councils through convening activities, including:

- **Science Africa – A collaborative engagement between the German Research Foundation and the SGCI:** This April 2016 engagement marked the first activity in close cooperation with the SGCI where

SGCI Collaborating Technical Agencies

Southern African Research and Innovation Management Association, Association of Commonwealth Universities, Central African Research and Innovation Management Association, West African Research and Innovation Management Association, East African Research and Innovation Management Association, New Partnership for Africa's Development – Planning and Coordination Agency (NEPAD-NPCA), the African Centre for Technology Studies, the Scinnovent Centre, Association of African Universities, Science, Technology and Innovation Policy Research Organization, and the African Technology Policy Studies Network.



The SGCI focuses on supporting the strengthening of capacities of publicly funded science granting councils (SGC) in 15 African countries: Botswana, Burkina Faso, Ghana, Kenya, Uganda, Tanzania, Rwanda, Ethiopia, Côte d'Ivoire, Malawi, Mozambique, Namibia, Senegal, Zambia and Zimbabwe; source: National Research Foundation of South Africa (NRF)

an opportunity was leveraged with research funding agencies outside the African continent (Germany, Canada, France, Japan, Switzerland, United Kingdom, the United States of America, and the European Research Council) for collaborative learning on the different structures of research funding organisations, and their research management processes.

- **Collaborating with the East African Science and Technology Commission (EASTECO) at the SGCI Annual Regional Meeting:** In August 2016, the SGCI activated an exciting collaboration with EASTECO by hosting the first East African Stakeholders Workshop on STI in Kigali, Rwanda. Attended by SGCI participating councils, regional East African stakeholders, and African policymakers, the workshop aimed at contributing to the development of EASTECO's strategic plan. EASTECO is the premier East African Community (EAC) organisation responsible for driving regional STI policy in the EAC.
- **A Focus on "Investing in research excellence" at the 2016 SGCI Annual Forum:** During November 2016, the SGCI Annual Forum and Global Research Council (GRC) Africa Regio-

nal Meeting were hosted by Fundo Nacional De Investigacao, Mozambique. The SGCI hosted its Annual Forum – in partnership with the African Union/New Partnership for Africa's Development – themed "Investing in research excellence in Africa". The GRC Africa Regional Meeting focused discussions by SGC heads of research councils on "building capacity and connectivity among granting agencies" and "the dynamic interplay between fundamental research and innovation." An academic symposium on agricultural innovation took place in collaboration with the Deutsche Forschungsgemeinschaft (DFG).

- **NRF stakeholder engagement workshop and SGCI annual regional meeting:** Bringing together over 100 representatives of science granting councils, universities, embassies and science ministries from 18 African countries, the July 2017 meeting presented an opportunity to share experiences, network, and engage in robust discussions to support effectiveness in the implementation of science granting council mandates.

The SGCI has been recognised with a Science Diplomacy Award by Minister Naledi Pandor, Minister of Science and Technology of South Africa during South Africa's Science Forum in December 2017.



Further Information

Science Granting Councils Initiative (SGCI)

▶ <http://sgciafrica.org/en-za>

New Partnership for Africa's Development (NEPAD)

▶ <http://www.nepad.org>

Association of African Universities (AAU)

▶ <https://www.aau.org>

Southern African Research and Innovation Management Association (SARIMA)

▶ <http://www.sarima.co.za>

East African Science and Technology Commission (EASTECO)

▶ <https://easteco.org>

The Scinnovent Centre

▶ <https://www.scinnovent.org>

African Centre for Technology Studies (ACTS)

▶ <http://www.acts-net.org>

African Technology Policy Studies Network (ATPS)

▶ <https://atpsnet.org>

Science, Technology and Innovation Policy Research Organization (STIPRO)

▶ <http://www.stipro.or.tz>

National Research Foundation of South Africa

▶ <http://www.nrf.ac.za>

UK: Department for International Development (DFID)

▶ <https://www.gov.uk/government/organisations/department-for-international-development>

Canada: International Development Research Centre (IDRC)

▶ <https://www.idrc.ca>

The Alliance for Accelerating Excellence in Science in Africa (AESA)

Deutsche Zusammenfassung

Die „African Academy of Sciences“ sowie NEPAD (New Partnership for Africa's Development) haben die „Alliance for Accelerating Excellence in Science in Africa“ (AESA) im Jahr 2015 gegründet. Die Grundfinanzierung wird durch das britische Ministerium für Entwicklungszusammenarbeit (DFID) sowie die weltweit agierenden gemeinnützigen Stiftungen „Wellcome Trust“ und die „Bill & Melinda Gates Foundation“ geleistet. Das langfristige Ziel von AESA ist es, eine gut vernetzte afrikanische Wissenschaftscommunity mit ausreichenden Ressourcen zu schaffen, die eine afrikanische Wissenschaftsagenda aufstellt und vor Ort umsetzt. Förderorganisationen wie der Wellcome Trust haben AESA bereits das Management einer Reihe von großen internationalen Programmen anvertraut. Dazu gehört das Flaggschiffprogramm DELTAS (Developing Excellence in Leadership, Training and Science Africa). Unter DELTAS werden elf Konsortien für Gesundheitsforschung aufgebaut, die insgesamt 54 Partnerorganisationen in Subsahara-Afrika verbinden. Neben dem Management internationaler Programme verfolgt AESA ein weiteres wichtiges Anliegen: Die junge Organisation will afrikanische Regierungen davon überzeugen, ihre Investitionen in Forschung und Entwicklung deutlich zu vergrößern.



Dr Tom Kariuki
Director
Alliance for Accelerating Excellence in Science in Africa (AESA)
African Academy of Sciences
Nairobi, Kenya

A funding platform for accelerating scientific excellence, leadership and innovation is defining Africa's scientific agenda and supporting the development of world class research leaders on the continent.

In 2015, the African Academy of Sciences and the NEPAD Agency launched the Alliance for Accelerating Excellence in Science in Africa (AESA) with the support of the Wellcome Trust, Bill & Melinda Gates Foundation and Department for International Development (DFID).

The Africa-led, Africa-centred and Africa-specific platform is developing strategies and mobilising resources to catalyse the development and implementation of Science, Technology and Innovation (STI) programmes in Africa. The key objective is to achieve a shift in the centre of gravity for decision making in Africa so that the African science agenda is increasingly being set, funded, implemented and evaluated by African leadership.

Since its launch, AESA has made progress in mobilising support for STI, attracting USD 150 million for its key flagship programmes that focus on climate change, improving the health of Africans, spurring innovation, building the capacity of scientists and science journalists and strengthening financial governance in research and development.

This funding has been provided as competitive grants to African scientists to develop and implement their ideas and to grow their careers. Funding for innovation is awarded to innovators resident in Africa with any level of experience, working in any discipline in colleges, universities, government laboratories, research institutions, non-governmental and non-profit organisations.

AESA is also helping to build the scientific capacity to create research facilities and environments to retain the continent's best talent. The goals are to contribute to increasing the number of scientists by five-fold over the next decade from the current 169 researchers per million inhabitants. In addition, AESA continues to actively encourage its grantees and partner organisations to recruit more women to change the narrative of only 22 percent of African scientists being women.

AESA supported scientists are playing a major role in conducting research that meets the needs of the continent and shaping and driving a health research agenda that is relevant to Africa. Africa's global

disease burden is 25 percent, a huge load carried by only 17 percent of the global population, and requires concerted efforts to provide solutions to improve the health of its people.

The leadership will also translate into increased funding for science to ensure that Africa's gross expenditure of research and development (GERD) as a percentage of gross development product (GDP) increases from the current inadequate 0.45 percent and spur its contribution to global scientific knowledge from 2.6 percent.

Promoting intra-Africa collaboration

Pooling human resources and providing people with career opportunities is important to encourage young Africa scientists to stay on the continent and contribute solutions to its challenges. Many leave because of lack of infrastructure and obfuscated career pathways. Additionally, diseases don't know geographical barriers; if there had been shared learning and experiences between east and west Africa, the continent would probably have muted the Ebola crisis and created better avenues for informed agenda setting, stronger resource mobilisation and higher chances of successful implementation.

AESA's programmes are focused on promoting intra-Africa collaboration with one programme – Developing Excellence in Leadership, Training and Science (DELTA Africa) – supporting 11 large consortiums spanning 21 countries and incorporating 40 lead and partner institutions to address emerging, infectious diseases as well as non-communicable diseases.

AESA is collaborating with centres of excellence in major universities and world-class research institutes on the continent to promote multi-investigator, trans-disciplinary teams to pioneer innovative research projects, which will speed discovery. These centres include basic, clinical and translational research programmes, are geographically dispersed throughout the continent, and they have the potential to serve as collaboration hubs for multi-national and continent-wide initiatives and for training young scientists.

Over time, AESA's aspires to partner with national governments to realise their dreams of founding

new centres, based on their own research priorities. These centres could become regional pillars for commercialising discoveries and launching spin out companies. To achieve success, they will require substantial long-term investment from African governments and other partners.

AESA is establishing advocacy initiatives to inspire African governments, philanthropists and the private sector to invest in STI. This includes engagement between scientific leaders and policymakers to fully appreciate the promise and impact of investing in research and development. This is particularly important to ensure that governments promote policies that foster innovation as well to as maintain their 2007 commitment to allocate one percent of national GDP to science at the African Union level.

Expanding the AESA partner network

The platform's global partners have been critical in advancing the agenda of AESA for Science, Technology and Innovation (STI). Such partnerships are more important than ever: funders not only make significant financial investment, but also help define a new era in global science, ensuring that decisions for Africa are made on the continent. This is critical as a step toward the development of research and human capital in and for Africa, to meet the needs of the continent as well as contribute to global welfare. AESA will continue to leverage new alliances and establish a network of social entrepreneurs and impact investors, especially through the Coalition for African Research and Innovation (CARI), an initiative aiming to create a platform within Africa from which a coalition stakeholders can build a highly coordinated, well-funded, innovative African research and development community together.

In collaboration with partners, the platform is promoting innovative solutions and advancing policy-relevant knowledge, provides insight and analysis, publishes reports and leads policy discussions.

The platform also regularly evaluates and measures the impact of the investments it and its partners are making in Africa.



Further Information

Alliance for Accelerating Excellence in Science in Africa (AESAs)

▶ <http://www.aesa.ac.ke>

AESA: Developing Excellence in Leadership, Training and Science (DELTA Africa)

▶ <https://aasciences.ac.ke/aesa/programmes/deltas/>

AESA: Good Financial Grant Practice (GFGP)

▶ <http://aasciences.ac.ke/aesa/en/programmes/gfgp/>

AESA: Coalition for African Research and Innovation (CARI)

▶ <http://aesa.ac.ke/cari/coalition-for-african-research-and-innovation/>

Partners of AESAs

▶ <http://aasciences.ac.ke/aesa/partners/overview/>

New Partnership for Africa's Development (NEPAD)

▶ <http://www.nepad.org>

African Academy of Sciences

▶ <https://aasciences.ac.ke>

Bill and Melinda Gates Foundation

▶ <https://www.gatesfoundation.org>

Wellcome Trust: Shifting the centre of gravity for African research funding

▶ <https://wellcome.ac.uk/news/shifting-centre-gravity-african-research-funding>

UK: Department for International Development (DFID)

▶ <https://www.gov.uk/government/organisations/department-for-international-development>

Tackling Global Challenges in Africa

A Long-Term European and African Research and Innovation Partnership on Food Security and Sustainable Agriculture (LEAP-Agri)

Deutsche Zusammenfassung

Im Jahr 2014 wurden Ernährungssicherheit und nachhaltige Landwirtschaft vom EU-Afrika-Gipfel als Schwerpunkte für die Forschungs- und Innovationspartnerschaft zwischen der EU und Afrika festgelegt. Mit der Umsetzung des LEAP-Agri-Programms beauftragt ist eine Partnerschaft von etwa 30 Einrichtungen, darunter 24 Fördereinrichtungen. Neben einer internationalen Organisation beteiligen sich Einrichtungen aus neun afrikanischen und neun europäischen Ländern (darunter Deutschland). 2017 hat LEAP-Agri eine erste gemeinsame Förderbekanntmachung für multilaterale Projekte veröffentlicht. Zugelassen sind Bewerbungen von Forschungskonsortien mit Partnern aus mindestens zwei afrikanischen plus zwei europäischen Ländern, welche sich an der Partnerschaft LEAP-Agri beteiligen.



Prudence Makhura
Member of LEAP-Agri Call Secretariat
Director Overseas Collaborative Grants and Initiatives
National Research Foundation
Pretoria, South Africa

Access to food remains a global challenge, with 805 million people not having enough to eat (Global hunger index 2014). Nutritional imbalances in Europe and Africa are increasing, characterized by persistent under-nutrition and growing diet-related diseases. It is projected that the global population will increase from 7 billion to more than 9 billion by 2050. The majority of this growth is expected to take place in Africa. In order to address the African and European Union's priority for research in Food and Nutrition Security and Sustainable Agriculture (referred to as FNSSA), and in line with the Sustainable Development Goals, 30 partners (24 of which are funders) from 19 African and European countries, decided to join forces and build an ambitious project, now referred to as "LEAP-Agri" (Long-term European and African research and innovation partnership on food security and sustainable agriculture).



Bernard Mallet
LEAP-Agri Deputy Coordinator
The French National Research Agency (ANR)
Paris, France

The LEAP-Agri Programme has two synergistic and complimentary broad objectives, i.e.

LEAP-Agri operates under the EU Framework Programme for Research and Innovation Horizon 2020 (H2020), and its EU-Africa High Level Policy Dialogue on Science, Technology and Innovation, which includes the implementation of the jointly funded EU-Africa Research and Innovation (R&I) Partnership focusing on food and nutrition security and sustainable agriculture (endorsed by the EU-Africa Summit 2014).

- First, on a short term, to jointly co-fund, collaborative European African research and innovation projects covering the whole Food System, then creating and fostering a large and long term research network with the objective of developing strategies to fill in the knowledge gaps in order to contribute to decision making.

- Second, building on synergies and outcomes of EU-Africa R&I existing projects and strategies, to feed the long term EU-Africa R&I flagship partnership in the FNSSA domain, by testing of innovative instruments for alignment, contributing to a joint Strategic R&I Agenda, and liaising with relevant stakeholder communities in the domain.

In order to manage a consortium this huge, a governance and administrative structure had to be designed so as to organize work and better coordinate activities at different levels, across countries and across regions. LEAP-Agri is managed by a 4-level governance structure:

- Firstly, there is the General Assembly which includes all 30 LEAP-Agri partners and will meet 3-times in the 5-year period of LEAP-Agri to approve high level decisions.
- Secondly, there is the Group of Funders Meetings where all the 24 funding agencies within LEAP-Agri come together to make decisions relating to joint calls.
- Thirdly, there are Work Package Leaders' Meetings (WPLs) which bring together all the 12 work package leaders to plan the work together for alignment and synergy purposes. There are six work packages (WP) in total and two WPLs per WP (one from Africa and one from Europe). The French ANR Funding Agency handles the global coordination of the project with the support of MEST (Kenya).
- Finally, the three funding agencies from three different countries (DLR-PT of Germany, NWO of The Netherlands, and NRF of South Africa) making up the LEAP-Agri Call Secretariat responsible for launching calls and managing the evaluation procedures.

For the component on the joint funding of research and innovation projects, the global contribution of partnering African and European countries amounts to 18.5 million Euro and taking in account the expected European Commission contribution, a total of 27.6 million Euro will be dedicated to the joint call for proposals.

Partners of the LEAP-Agri Consortium

African Countries

- Algeria: Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (MESRS)
- Burkina Faso: Fonds National de la Recherche et de l'Innovation pour le Développement (FONRID)
- Cameroun: Ministry of Scientific Research and Innovation (MINRESI)
- Egypt: Ministry of Higher Education & Scientific Research (MHESR)
- Ghana: Science and Technology Policy Research Institute (CSIR)
- Kenya: Ministry of Education Science and Technology (MEST)
- Senegal: Ministère Enseignement Supérieur et de la Recherche (MERS)
- South Africa: National Research Foundation (NRF)
- Uganda: Uganda National Council for Science and Technology (UNCST)

European Countries

- Belgium: Fonds de la Recherche Scientifique (FNRS), Research Foundation Flanders / Fonds Wetenschappelijk Onderzoek (FWO), Belgian Federal Science Policy Office (BELSPO)
- Finland: Suomen Akatemia (AKA), Finnish University Partnership for International Development – University of Jyväskylä (JYU)
- France: Agence Nationale de la Recherche (ANR), Institut de Recherche pour le Développement (IRD), Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), Agence Française de Développement (AFD)
- Germany: DLR Project Management Agency (DLR-PT), Bundesanstalt für Landwirtschaft und Ernährung (BLE)
- Netherlands: Ministry of economic affairs / Agriculture and Nature Knowledge Department (MINEZ), Netherlands Organisation for Scientific Research (NWO), Stichting (DLO)
- Norway: Research Council of Norway (RCN)
- Portugal: Fundação para a Ciência e a Tecnologia (FCT)
- Spain: Ministry of Economy, Industry and Competitiveness (MINECO), Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA)
- Turkey: The Scientific and Technological Research Council of Turkey (TUBITAK)

International Organisation

- Centro Internazionale di Alti Studi Agronomici mediterranei – Istituto Agronomico Mediterraneo di Bari (CIHEAM)



First General Assembly for the launching of LEAP-Agri held in Pretoria, South Africa, 5-7 December 2016; source: National Research Foundation of South Africa (NRF)

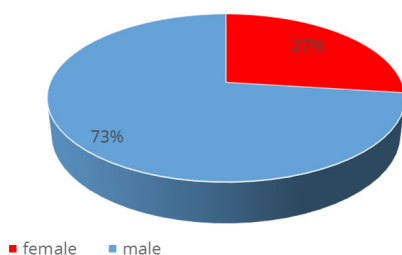
This joint multilateral call for preliminary proposals was launched on 15 March and closed 15 June 2017. A total of 200 preliminary proposals were received and only the 191 eligible ones were submitted for review. To be eligible proposals had to be submitted by consortia consisting of researchers from a minimum of four different countries (two African and two European) that are a partner in LEAP-Agri. Each consortia had to appoint a Consortium project coordinator who takes full responsibility for the

project deliverables. See below the spread, in terms of gender and region, of the Consortium project coordinators within the 191 eligible proposals.

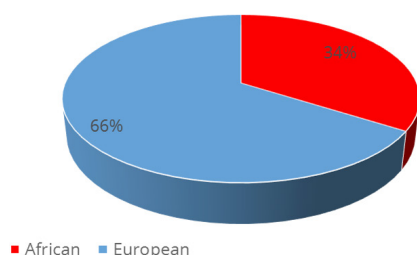
Also, joint proposals could only be submitted within the three main topics of the LEAP-Agri call, i.e.

- Sustainable agricultural production intensification, in relation with social, economic and environmental aspects, including aquaculture;
- Population nutrition and health in relation with agriculture and food systems;
- Access to food, expansion and improvement of agricultural markets and trade, including local and territorial dynamics.

Consortium project coordinator – gender



Consortium project coordinator – region



Source: National Research Foundation of South Africa (NRF)

Based on the recommendations by the independent International Review Panel (IRP) that was responsible for the evaluation of preliminary proposals, 86 joint projects were invited to submit a full proposal by the closing date of 7 December 2017. The IRP, consisting of 21 members, two co-chairs (one African

Focus	number	%
Sustainable intensification	156	50,16
Agriculture and food systems for nutrition	110	35,37
Expansion and improvement of agricultural markets and trade	45	14,47

Focus areas chosen by applicants within the 191 eligible proposals (applicants were allowed to choose more than one focus area); source: National Research Foundation of South Africa (NRF)

and one European), one independent observer, the LEAP-Agri coordinators (also as observers) met on 4-6 September 2017 for the final scoring and ranking list.

The Call Secretariat plans to have the IRP meeting for the evaluation of the full proposals during the week of 16 April 2018 in The Hague (Netherlands) to enable the start of the jointly funded projects in August 2018.

BLE (Germany) and Fonrid (Burkina Faso) lead the second main component of the project (Feeding the long-term EU-AU strategy and partnership in the FNSSA domain). Activities are under preparation within the LEAP-Agri teams and will be implemented in close interaction with the main FNSSA stakeholders.

The LEAP-Agri partnership acts as a new innovation platform for joint African-European partners, joint co-funding, and joint programming initiative. The hope is that, at the end, the partnership will significantly impact on promoting the EU-AU scientific research and innovation cooperation agenda on FNSSA for both continents and beyond.



Download

Joint Africa and EU Strategy (infographic)

► http://ec.europa.eu/research/iscp/pdf/policy/africa_eu-strategy_infographic_en_update%202017.pdf

Roadmap for EU-African Union S&T Cooperation (2017)

► http://ec.europa.eu/research/iscp/pdf/policy/africanunion_roadmap_2017.pdf

Roadmap towards a jointly funded EU-Africa Research & Innovation Partnership On Food and Nutrition Security and Sustainable Agriculture (FNSSA) (2016)

► http://ec.europa.eu/research/iscp/pdf/policy/eu-africa_research_innovation_cooperation_on_fnsa_en.pdf



Further Information

LEAP-Agri

► <http://www.leap-agri.com>

Africa-EU Science, Technology and Innovation Portal

► <http://africa-eu-sti-portal.net/index.php>

European Commission: News on International Research and Innovation Cooperation with Africa

► <http://ec.europa.eu/research/iscp/index.cfm?pg=africa>

The West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL)

Deutsche Zusammenfassung

Seit dem Jahr 2010 hat das Bundesministerium für Bildung und Forschung (BMBF) mit Finanzmitteln von mehr als 100 Millionen Euro jeweils ein wissenschaftliches Servicezentrum zu Klimawandel und Landmanagement in den Regionen südliches Afrika und Westafrika aufgebaut. Ziel ist es, die Bildungs- und Forschungskapazitäten vor Ort so zu stärken, dass afrikanische Länder selbständig entscheiden können, wie sie sich dem Klimawandel anpassen. Fünf afrikanische Länder beteiligen sich an dem „Southern African Science Service Centre on Climate Change and Adapted Land Use“ (SASSCAL). An der Schwesterorganisation „West African Science Service Centre on Climate Change and Adapted Land Use“ (WASCAL) sind insgesamt zehn westafrikanische Länder beteiligt. Die langfristige Finanzierung der Aktivitäten von WASCAL soll sowohl durch die Zusammenarbeit mit der „African Development Bank Group“ (AfDB) und regionalen Organisationen wie der „Economic Community Of West African States“ (ECOWAS) als auch durch die Etablierung von WASCAL als Forschungsdienstleister sichergestellt werden.



Prof Dr Jimmy Adegoke
University of Missouri-Kansas City (UMKC)
Kansas City, USA
At the time of the interview, he held the position of Interim Executive Director of WASCAL

The German Federal Ministry of Education and Research (BMBF) is supporting a number of African countries in setting up and running two science centers that will help them tackle the effects of climate change. Expertise in the region will be developed and strengthened so that the continent does not lose it when the research projects end. These centers are called “Regional Science Service Centers on Climate Change and Adapted Land Use” WASCAL, in West- and SASSCAL in Southern Africa. After a one-year preparation phase, Germany has been working in this context since 2010 with a total of ten countries in West Africa (Benin, Burkina Faso, Côte d’Ivoire, Gambia, Ghana, Mali, Niger, Nigeria, Senegal and Togo) and with five countries in Southern Africa (Angola, Botswana, Namibia, Zambia and South Africa). The aim of the program (supported with more than 100 million Euro) is to strengthen the research, educational and policy capacity and competency of member countries

in West and Southern Africa to deal with issues of climate change through adapted land use on a scientific basis, in partnership with institutions presently mainly from West Africa, Southern Africa and Germany, but also beyond. It is the intention to build up scientific structures that enable regions most highly affected by climate change to make their own valid decisions regarding land-use and water supply. And as such to make people and environment resilient to the negative impacts of Climate Change.

Interview with Jimmy Adegoke

ITB: How do you plan to secure the overall sustainability of the so far achieved scientific expertise and high quality research within the German-African cooperation?

Jimmy Adegoke: With regards to WASCAL, one of the most significant investments of this BMBF sponsored initiative is the establishment of ten Graduate Schools in nine of the WASCAL member countries with the 11th Graduate School on Informatics for Climate Change scheduled to commence in the 10th member country (Burkina Faso) within a few months. These WASCAL graduate programs are hosted by leading universities in our member countries and the degrees are awarded by those universities. This arrangement ensures that the sustainability of the WASCAL graduate programs is assured because the host universities will ultimately assume full responsibility for the operation of the graduate schools in the

future when direct funding support from WASCAL ceases. Currently all the student beneficiaries of the WASCAL Graduate Studies Program are fully supported financially with monthly stipends, travel funds and research budgets. The WASCAL Governing Board recently approved a plan proposed by the WASCAL Capacity Building Department to begin recruiting fee paying students who may be privately sponsored, supported with external scholarships by member countries or through mechanisms such as the World Bank African Centers of Excellence (ACE) program and the DAAD in-country/in-region scholarship program.

Additionally, we are taking action to fundamentally improve the capacity of WASCAL as an organization to effectively compete for grant funding within Africa and beyond. These efforts include establishing a new Contract Research and Development Office (Contract R&D) with the capacity and requisite training to offer proposal development support and Request for Proposal (RFP) intelligence gathering and dissemination services to WASCAL researchers at our Competence Center and Graduate School Programs. Our goal is to raise about 250 million Euro in new funding by 2030 through Contract R&D and direct provision of consultancy expertise/services to our member countries.

ITB: What are the further steps to finance WASCAL without the seed funds of BMBF?

Jimmy Adegoke: Funding issues have particularly become challenging as several organizations are now in competition for limited funds. In order to stay in the loop, WASCAL needs to develop a resource mobilization strategy to guarantee the organization's long-term sustainability. We have recently developed such a strategy, which describes the competitive funding landscape and identifies various activities and stakeholders critical to WASCAL's resource mobilization process. One of the major steps is to demonstrate the strategic alignment of WASCAL's research agenda and underlying competencies with global, continental and regional needs outlined in relevant policies and agenda such as the Sustainable Development Goals (SDGs). We believe that significant opportunities exist for WASCAL to access the level of funding required to maintain its current competences and activities. The long-term fund raising target of WASCAL is 500 million Euro in new investments from the national

budgets of WASCAL member countries, the global donor community, traditional and non-traditional development partners, private sector corporations and individuals, by the year 2030. We envisage that about half of this amount (250 million Euro), will be raised collaboratively with other regional organizations to create and co-manage a West African Climate Resilience and Ecological Fund (WACREF). This is a global mobilization effort of financial resources, governance structures, scientific manpower and technology to enhance human well-being and improve livelihoods by bridging the knowledge, climate services, environmental data platforms and observation systems gaps in West Africa. To realize this objective, WASCAL will partner with the African Development Bank to drive this effort along with a consortium of organizations in the sub-region including ECOWAS (Economic Community Of West African States), ACMAD (African Center of Meteorological Application for Development) and others.

The other half will be raised through Contract R&D activities of WASCAL and expected support from current and future core funders. The Contract R&D funding target and potential sources of income are briefly discussed in response to question 2, above.

ITB: Are there plans for a further research program from 2018 onwards and will the research focus and herewith partners be changed?

Jimmy Adegoke: WASCAL is reorganizing itself to become more agile and responsive to the continent's needs, hence the WASCAL Research Action Plan 2018-2021 (WRAP 2.0). We will of course maintain our current partners where possible but WRAP 2.0 is also a platform for extending our partnerships to other non-German research institutions in Europe and elsewhere. WASCAL 2.0 is organized around four main flagship programs (FPs) addressing challenges that are relevant to sustainable development in West Africa. The FPs contribute to the African Development Bank's new ambitious Strategy for Agricultural Transformation in Africa, as enablers with specific attention to Enabler 1 "Increase Productivity", Enabler 4 "Create an Improved Agribusiness Environment", and Enabler 6 "Increase Inclusivity, Sustainability, and Nutrition" to achieve agricultural transformation in Africa by 2025.

The proposed services from the flagships address three of the seven aspirations of the African Union Agenda 2063: Aspiration 1, “A prosperous Africa based on inclusive growth and sustainable development” (FP2-Resilient Socio-ecological Landscapes, FP3-Sustainable Intensification and Food Security); Aspiration 6, “An Africa whose development is people-driven, relying on the potential of African people, especially its women and youth, and caring for children” (FP2-Resilient Socio-ecological Landscapes); Aspiration 7, “Africa as a strong, united, resilient and influential global player and partner” (FP1-Provision of climate and environmental services, FP4-Climate Modelling and Seasonal Forecasting).

In addition, regional bodies who are beneficiaries of WASCAL’s climate services such as ECOWAS, ACPC (The African Climate Policy Centre), ACMAD, river basin authorities, etc. will serve as intermediaries between WASCAL (as a climate service centre) and the eventual beneficiaries of services provided (e.g. smallholder farmers). As they receive services, these agencies will develop appropriate policy directives, regulatory measures, and adaptation strategies needed to reduce the impacts of climate change. WASCAL will rely on the regional influence of institutions like ECOWAS, and extensive dissemination networks, such as those of national ministries, to convey pertinent information to the lowest levels of the development hierarchy.

Feedback mechanisms will be established to identify new demands and possible improvements in services provided.

ITB: Reflecting the situation of the soon ending main phase of WASCAL do you think that the final structure of the institution itself has been reached or is there still a process of optimization necessary?

Jimmy Adegoke: Any research or educational institution has to be ready and willing to change to be successful in the current environment of rapid technological advancement and diminishing public funding support for higher education. WASCAL is not an exception. Our entire research enterprise in Ouagadougou is still accommodated in a rental property which has restricted the development of the WASCAL research program to date. For example, the Service component of WASCAL, which is intended

to be housed in the Competence Center, has still not taken off and yet it is one of the three pillars upon which the WASCAL vision rests. Several other actions are required to better position WASCAL for long-term success as a leading regional institution for West Africa.

The interview was conducted by Dr-Ing Olaf Pollmann, PhD in Environmental Sciences (DLR Project Management Agency).



Download

African Development Bank (AfDB)
Strategy for Agricultural Transformation in Africa
▶ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Feed_Africa_Strategy_for_Agricultural_Transformation_in_Africa_2016-2025.pdf



Further Information

The West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL)
▶ <http://www.wascal.org>

The Southern African Science Service Centre on Climate Change and Adapted Land Use (SASSCAL)
▶ <http://www.sasscal.org>

African Union (AU) Agenda 2063: About
▶ <https://au.int/agenda2063/about>

Economic Community Of West African States (ECOWAS)
▶ <http://www.ecowas.int>

The African Climate Policy Centre (ACPC)
▶ <https://www.uneca.org/acpc>

African Center of Meteorological Application for Development (ACMAD)
▶ <http://acmad.net/new/?q=en/pages/about-us>

Research Networks for Health Innovations

Deutsche Zusammenfassung

Für den Zeitraum von 2016-2021 wird das Bundesministerium für Bildung und Forschung (BMBF) insgesamt bis zu 50 Millionen Euro bereit stellen, um in Subsahara-Afrika fünf deutsch-afrikanische Forschungsnetzwerke für Gesundheitsinnovationen zu fördern. Die Netze bestehen aus je zwei deutschen und bis zu neun afrikanischen Partnern. Der Großteil der Projekte widmet sich armutsassoziierten Infektionskrankheiten wie Tuberkulose. Dagegen erforscht das Netzwerk CEBHA+, „Collaboration for Evidence-Based Healthcare and Public Health in Africa“ die Verbreitung von nicht übertragbaren Krankheiten wie Diabetes und Bluthochdruck sowie die Auswirkungen von Unfallverletzungen. Beteiligt sind zwei deutsche Partner sowie Partner aus fünf Ländern Subsahara-Afrikas: Äthiopien, Malawi, Ruanda, Südafrika und Uganda. Wie üblich, wird die Koordination des Netzwerkes vor Ort geleistet – in CEBHA+ durch eine Forscherin an der Makerere Universität in Uganda. Ziel von CEBHA+ ist es, eine Infrastruktur zu schaffen, die belastbare Daten erhebt, damit langfristig die Gesundheitsfürsorge verbessert werden kann. Nationale oder länderübergreifende CEBHA+-Exzellenzzentren sollen Institutionen im Gesundheitswesen künftig beratend zur Seite stehen.



Prof Harriet Mayanja-Kizza
Dean of the School of Medicine
Makerere University
Kampala, Uganda

The funding initiative is well-embedded in the funding concept of the German Federal Ministry “Global Health in the focus of research”, the Ministry’s Africa Strategy and its Internationalization Strategy.

Thematically, the focus was set on research questions with a high relevance for the local and regional demands of the African partners. The topics of the call ranged from public health and health systems research to improve therapy, over research on diseases placing a high burden on society, including poverty related and neglected tropical diseases (PRDs and NTDs), and non-communicable diseases to basic epidemiological research to improve health data and understanding of existing health problems. Networks solely focused on basic research were excluded from the call.

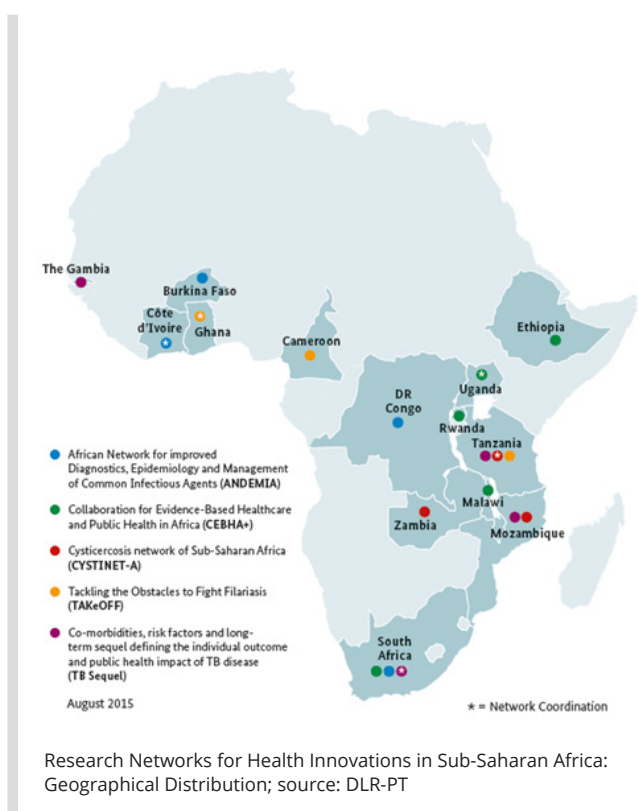
In addition, strengthening the health research by networking and capacity building on different levels is a fundamental part of the networks.

The five following research networks were selected for funding under the initiative:

- ANDEMIA, the African Network for Improved Diagnostics, Epidemiology and Management of Common Infectious Agents is focused on respiratory and gastrointestinal diseases, acute fever and infections with antimicrobial resistant pathogens.

With its funding initiative “Research Networks for Health Innovations in Sub-Saharan Africa” the German Federal Ministry of Education and Research seeks to strengthen the research cooperation in health research with developing countries in Sub-Saharan Africa. At the same time, the successful research networks should also contribute to strengthening the regional and continental cooperation, also between universities and non-university research institutions.

- CEBHA+ is the Collaboration for Evidence-Based Healthcare and Public Health in Africa (see below).
- CYSTINET-Africa, the Cysticercosis Network for Sub-Saharan Africa, aims at filling gaps towards the control and elimination of *Taenia solium* (neuro-) cysticercosis/taeniosis.
- TAKEOFF, Tackling the Obstacles to Fight Filariasis, aims at improving the treatment for filariasis by working towards the harmonization of the procedures for clinical trials in filariasis.
- TB-Sequel looks at the co-morbidities, risk factors and long-term sequel defining the individual outcome and public health impact of TB disease.



The total funding volume of the initiative amounts to 50 million Euro for a duration of five years, from 2016 – 2021. All of the research networks are research-driven, autonomous networks with two German and up to nine African partners. In order to facilitate the implementation at the local level, medical progress requires the development of specific

solutions jointly with the partner countries. Therefore, it has been ensured that most of the funds are allocated to the African research institutions and that each of the research networks is led by an African coordinator at an African institution.

When consulting medical doctors, pharmacists, clinics or other health care services, we usually take it for granted that the advice and treatment we receive is efficient and based on reliable scientific proof and experience. Likewise we assume that health systems are set up in a way that responds best to the medical needs of citizens. However, these assumptions don't stand a closer look. Medicine all over the world includes traditions, rumours, hope and belief and a given treatment may not be state of the art or inefficient or in the worst case counter-induced. On the other hand health policy makers often are confronted with a variety of sometimes contradictory scientific information and competing agendas and they are faced with the challenge to decide without being able to judge the relevance of this information appropriately. To prioritize and allocate resources efficiently, health policy makers need evidence based information to make decisions. Hence science is badly needed that scrutinizes scientific evidence, health needs, and the combined medical and societal impact a treatment or health intervention may have.

The research network CEBHA+, "Collaboration for Evidence-Based Healthcare and Public Health in Africa", addresses this niche in research with the direct objective of gathering data to impact on policy and practice. The research network has emerged from the Collaboration for Evidence Based Healthcare in Africa established in 2010. It is coordinated by Prof Mayanja-Kizza from the Makerere University in Uganda and brings together seven partners from five African countries as well as two German partners. During the planning stages, the stakeholders of this network discussed the priority areas in Africa for research towards public health interventions for non-communicable diseases with hypertension, diabetes and road traffic injuries decided for inclusion in the grant writing.

Although African countries have a high burden of infectious diseases; with changing life style, increasing life expectancy and the improved response to infectious diseases, the burden of non-communi-

cable diseases is on the rise, too. Hypertension and diabetes mellitus are two conditions with a rising morbidity and mortality in Africa. They impact not only the general well-being of an individual, but also the family lifestyle, resources and employment. Furthermore, there is an increased mental impact, often with overt depression and risks of organ damage have been reported. The public, especially the adult working population is acutely aware of these two diseases, as many may be affected directly or indirectly. Both diseases are preventable to a large extent, and it is important to determine public health measures that can be implemented on a wide scale, with appreciable impact on outcome.

Trauma, especially road traffic injury is a modern day epidemic. It is linked to the rapid urbanization seen in many African countries today as well as the need for ease and speed of travel. In areas with lower-cost second hand vehicles, as well as the recent introduction of motorcycle and tricycle modes of transport, with limited regulatory control, a new wave of mainly head injuries and skeletal injuries has been observed. Both are traumatic to an individual, as well as the families – often with meager resources, and carry a high morbidity and mortality. These areas have not attracted a lot of attention in public health prevention so far.

The overarching goal of CEBHA+ is to establish long-term capacity and infrastructure for evidence-based healthcare and public health in Sub-Saharan Africa. With a robust interdisciplinary research to develop, evaluate and implement interventions, CEBHA+ seeks to fill major gaps in the existing evidence base and overcome the disconnect between primary research, evidence synthesis and rapid implementation of findings.

In terms of long-term capacity building, the network aims at establishing CEBHA+ centres of excellence for decision makers to seek reliable advice. In Uganda, there is a definite interest in controlling these non-communicable diseases at the Ministry of Health. There are dedicated desks for non-communicable diseases and road traffic injuries at the Ugandan Ministry of Health, thus showcasing how policy makers are already aware of these problems in some countries.



Download

German Federal Ministry of Education and Research (BMBF): Global Health in the Focus of Research (2015)

► https://www.gesundheitsforschung-bmbf.de/files/Global_health.pdf

BMBF: Africa Strategy 2014-2018

► https://www.bmbf.de/pub/Afrika_Strategie_eng.pdf

BMBF: Factsheet CEBHA+

► https://www.gesundheitsforschung-bmbf.de/files/bmbf_173_2_cebha_fact-sheet_barrierefrei.pdf

German Federal Government's Strategy for the Internationalisation of Education, Science and Research (February 2017)

► https://www.bmbf.de/pub/Internationalization_Strategy.pdf



Further Information

Bundesministerium für Bildung und Forschung (BMBF): Gesundheitsforschung in internationaler Kooperation (in German)

► <https://www.gesundheitsforschung-bmbf.de/de/gesundheitsforschung-in-internationaler-kooperation.php>

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Internationalisation
VDI-Platz 1
40468 Düsseldorf
Germany

COMMISSIONED BY



Federal Ministry of Education and Research
Division 211 – Policy Issues, Internationalization
Strategy
53170 Bonn
Germany

Editing

- ▶ Dr Stefan Wagener, DLR-PT
+49 228 3821-1825, stefan.wagener@dlr.de
(Head of Division Africa, Middle East, Turkey)
- ▶ Dr Sonja Bugdahn, DLR-PT
+49 228 3821-1474, sonja.bugdahn@dlr.de
(Content concept, German summaries)
- ▶ Dr Andreas Ratajczak, VDI TZ
+49 211 6214-494, ratajczak@vdi.de
(Editorial coordination)

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