

The CAAST-Net Bulletin

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NETWORK FOR THE COORDINATION AND
ADVANCEMENT OF SUB-SAHARAN AFRICA-EU
SCIENCE AND TECHNOLOGY COOPERATION

a **Research** publication

SADC-Europe solar energy symposium in Malawi

The Malawian Ministry of Education, Science and Technology will host a symposium on solar energy in Malawi's capital city, Lilongwe, from 26 to 28 July this year, facilitated by CAAST-Net and its partners in cooperation with the Southern African Development Community (SADC). The symposium will be held at Lilongwe's Crossroads Hotel under the theme "Advancing mutual understanding of renewable and solar energy research and their supporting policy frameworks in Europe and the Southern African Development Community". About 35 scientists, policymakers, academics and representatives from industry, coming from both the 14-member SADC and the 27-member European Union (EU), are expected to attend this month's event.

Solar energy research has been identified by the SADC as a regional science and technology priority, coming from the 2005 Science and Technology Consolidated Plan of Action (CPA) of the African Union Commission (AUC) and the New Partnership for Africa's Development (NEPAD), and the SADC recently formulated its Regional Energy Access Strategy and Action Plan as a step towards realigning the energy sector in light of the most recent technological developments and research, including the Africa-EU Energy Partnership (AEEP), chaired by Austria, Germany, the AUC and Mauritius, which aims to increase the use of solar energy in Africa by 500 megawatts by 2020. The Joint Africa-EU Strategy's Action Plan for 2011 to 2013 also supports renewable energy, including solar power.

The EU has a renewable energy policy, adopted in 2010, which has seen the European member states endorse a binding target to source 20 percent of the bloc's energy needs from renewable sources by 2020. The decade-long Solar Europe Industry Initiative (SEII), part of the EU's Strategic Energy Technology (SET) plan, has an estimated budget of 16 billion Euros and constitutes a potentially rich resource to inform SADC's solar research and innovation strategies. The initiative, focused on both photovoltaics (PV) and concentrated solar power (CSP), not only aims to make these technologies more competitive but also seeks to facilitate their penetration into urban and rural energies and their introduction into the electricity grids. In addition to European interest in both PV and CSP articulated through SEII, Europe has interest in other solar energy technologies such as solar thermal energy (STE).

Some of the solar energy research challenges facing the SADC region will be included in an analytical paper being prepared for the Malawi meeting by South Africa's Department of Science and Technology (DST) and the Association of Commonwealth Universities (ACU), which will be reviewed by the SADC Secretariat prior to the symposium. Within the SADC region the opportunities and importance of renewable energy is widely acknowledged," states one SADC Renewable Energy Strategy and Action Plan (RESAP) document, from February 2011, which places renewable energy challenges in the context of competing infrastructural demands. The document stated, "Renewable energy resources in the region are abundant and versatile, especially solar energy, biomass energy and hydro power. On the other hand, energy based on fossil fuels is still available at affordable cost, like the coal-based power from South Africa, for instance. Therefore, investments on and consequent energy

production from renewable resources should be technically and economically competitive with the existing and new energy production based on fossil fuels. This, in addition to high initial investments required for the energy investments in general, will be challenging for many Member States, which lack funding for development of energy infrastructure. In addition, all energy investments have to compete for scarce funding with other infrastructure investments, like those on schools, hospitals, roads, etc."

The Malawi symposium is due to have two complementary strands of discussion. On the one hand, through policy exchanges with European experts, the goal is to inform the preparation of a SADC solar energy research programme or initiative, including the fostering of an innovation policy environment, which will enable an optimal translation of research results to enhance the introduction of solar energy into the SADC renewable energy base. The second objective will be to explore how mutually beneficial solar energy and innovation partnerships between SADC and Europe could best be promoted, drawing on the various research and other cooperation instruments between the two regions.

Seven sessions are planned for the Malawi meeting: enhancing mutual understanding of the policy context and frameworks for solar energy research, with special reference to national and regional targets for renewable energy in the European and SADC regions; enhancing mutual understanding of the solar energy research landscape and its opportunities and challenges in the European and SADC regions; elements of a regional research and innovation programme on solar energy: challenges and lessons learned; fostering the transfer and translation of the outputs of solar energy research and development into applications for the solar energy base in SADC and EU; overview of potential funding instruments for Africa-Europe cooperation in research and development; exploring the potential for SADC-Europe partnerships in solar energy research – designing scenarios; and the way forward.

The meeting comes at a time when the SADC region has been laying the groundwork for further research into solar power. Odala Matupa, the programme officer for power in the SADC energy sector, directorate of infrastructure and services, has been closely involved in the preparation of the SADC RESAP, which was initiated in March 2011. The SADC RESAP, done with the assistance of the ministry of foreign affairs of Finland, is expected to be concluded this year. While much of the focus of the RESAP is on bioenergy, it will also include solar energy, according to the SADC documents for the tender for the preparation of the RESAP. The RESAP will complement the SADC Protocol on Energy signed in Maseru, Lesotho, in 1996 to provide incentives to attract private sector investment in energy.

The objective of the three-day solar energy symposium is to foster an exchange of experiences from experts in the SADC region and Europe to inform the development of renewable energy research, specifically in the field of solar energy, in the SADC region.

Calendar

Event	Location	Date	Website	Contact
Solar Energy Symposium	Lilongwe, Malawi	26-28 July 2011	www.caastr-net.org	Andy Cherry CAAST-Net coordinator a.cherry@acu.ac.uk
CAAST-Net Stakeholder Conference on Africa–Europe S&T cooperation	Dakar, Sénégal	November 2011	www.caastr-net.org	Andy Cherry CAAST-Net coordinator a.cherry@acu.ac.uk

What is CAAST-Net?

CAAST-Net is a bi-regional platform whose goal is improved quality and quantity of cooperative efforts between Europe and Africa in science and technology, targeting areas of mutual interest and benefit, particularly through greater use of the European Union's Seventh Framework Programme (FP7) as well as national programmes and other bilateral and multilateral instruments supporting international cooperation, and through lobbying for more synergy between research and development (R&D), and development cooperation. In support of its goal, CAAST-Net has a range of activity clusters aiming:

- to support and inform existing Europe-Africa science and technology policy dialogue and cooperation processes;
- to identify and prioritise common research areas of mutual interest and benefit, especially for inclusion in the thematic priorities of the FP7 Cooperation programme, harnessing cooperation to address specific problems faced locally and regionally within Africa as well as common problems of a global nature;
- to promote synergy between Europe-Africa science and technology partnerships and development cooperation instruments in order to enhance the creation and application of new knowledge in support of achieving the millennium development goals, poverty alleviation and economic growth;
- to undertake specific activities dedicated to strengthening the participation of African countries in the current and future Framework Programmes through events aimed at raising awareness, providing information, brokering partnerships and optimising synergies;
- to monitor the performance and impact of Europe-Africa science and technology cooperation under the FP7 to inform future cooperation policy;
- to network and encourage the sustainability of specific EU-Africa cooperation projects that respond to priorities of the 8th partnership of the Joint Africa-EU Strategy.

CAAST-Net's activities are conceived as support for the implementation of Africa's continental priorities in science and technology, as expressed for example in the AU/NEPAD continental plan of action, particularly where there is mutual EU-Africa benefit.

A key pillar of CAAST-Net's strategy is mobilising activities in cooperation with Africa's regional economic communities, recognising their vital role in regionalising the implementation of continental priorities, and leveraging international cooperation to advance those priorities.

Many of CAAST-Net's activities, such as brokerage events, conferences, information days and thematic discussion platforms, are open to participation by interested parties. CAAST-Net has an "open-door" policy with its wider stakeholder community and is dedicated to continued dialogue and networking with our stakeholder community.

The CAAST-Net Bulletin is our primary means of communicating our plans, activities and outputs to our stakeholders. We very much welcome your feedback and strongly encourage your involvement and association with the project.

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If you would like to contribute an article to the CAAST-Net Bulletin, please email at @research-africa.net.

Challenges facing cooperation in science and technology in the next decade



Erika Kraemer-Mbula, CAAST-Net advisory panel member

Science and technology have driven huge leaps in knowledge, powering economic and social development around the world. As a result, the last decades have witnessed the fast and profound transformation of our natural, social and productive environments. However, the benefits of such profound changes have been unevenly distributed. Uneven development is manifest in unequal access to knowledge, resources, energy, markets, health and education. Growing interdependence between countries encourages the free flow of people and capital but also facilitates the spread of disease vectors and financial instability. Human and socio-economic progress is leading to increased instabilities in many ecological systems. Confronting these challenges requires multilateral cooperation to rethink and strengthen international alliances in science, technology and innovation (STI). Some of the more profound challenges that remain however relate to:

• STI – broadening the scope to innovation

Innovation introduces new knowledge and technologies into society through access, distribution and diffusion. Scientific research is an important ingredient for some technological innovations. However, non-scientific knowledge and non-technological innovations can also be vital to create commercial value, especially in developing countries. Harnessing this knowledge and identifying partners' complementarities in cooperation on innovative activities remains a big challenge due to the persistent prevalence of the focus on science, rather than innovation.

• Addressing social challenges

The current widespread socio-political distress in several countries suggests the important role of civil society in ensuring the stability of economic and political systems, both in developing and developed countries. Agendas for multilateral STI cooperation must address social challenges and reflect a wide range of needs and interests. It is critical that STI advances are not only productive, but also suitable and useful to different social and economic environments. It remains a global challenge to ensure the wider participation of a variety of stakeholders in prioritising STI cooperation agendas' ways that articulates broad demands and needs.

• Building capabilities of stakeholders

Strengthening capabilities and human resources in STI are vital to the future of international cooperation on STI. This is a major concern, because poor capabilities cause a big shortage of skills in key domains that enable better understanding of problems, discovery of hidden potential, speedy removal of obstacles to improving STI, and tackling new and unexpected problems. In many cases, access to technology is difficult due to the inadequacy and inefficiency of existing capabilities.

• Measuring achievements and results of S&T cooperation

Monitoring the performance and impact of STI activities and STI cooperation improves informed decision-making, as well as identifying and promoting emerging areas where STI-based solutions may be required. Benchmarking as it is practiced today, shows a number of shortcomings with respect to its impact on learning, innovation and decision-making. Two of the remaining

challenges on benchmarking are (i) the need to set up benchmarking frameworks that incorporates increasing complexities in ever-changing landscapes, and (ii) that achievements can take many forms: from capacity building to policy learning and institutional development. Capturing such a variety of outcomes and impacts requires urgent efforts to expand existing indicators, explore new avenues of benchmarking, and open up creative mechanisms for cross-cultural analysis of findings.

Addressing these challenges is neither simple nor easy, but nevertheless urgent. As global challenges and instabilities become more pressing, international cooperation in STI needs to adopt a broader perspective in order to address issues that cross national boundaries. Also, a growing number of scholars and practitioners working on poorer countries increasingly find the need to adjust STI cooperation for it to make sense or be useful in their respective environments. This requires not only further intellectual efforts but also efforts to involve a wider range of stakeholders and citizen groups.

Profile

Erika Kraemer-Mbula has recently been appointed as a member of the CAAST-Net advisory panel for 2011 and 2012. Initially trained as an economist, Kraemer-Mbula completed a master's degree in science and technology policy from the Science and Policy Research Unit (SPRU) at the University of Sussex and before going on to a doctorate in development studies from the University of Oxford. Her research interests have focused on science and technology policy analysis, innovation systems, and various routes to creating technological competencies in Africa, including public policy, technological learning and international cooperation. In her academic and professional career, she has adopted a cross-disciplinary approach to explore alternative development paths for African countries. Kraemer-Mbula has undertaken a range of advisory and consultancy assignments with international institutions such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Industrial Development Organization (UNIDO), the Organisation for Economic Co-operation and Development (OECD) and the World Bank. She is an active member of several international research networks.

In 2006, Kraemer-Mbula co-authored the monograph *Industrial Competitiveness in Africa: Lessons from East Asia* (Intermediate Technology Development Group) and last year she co-edited a volume on *Innovation and the Development Agenda* (OECD/International Development and Research Centre). Her working paper, *Rethinking the Benchmarking of Agricultural and Rural Innovation*, is due out later this year. She is affiliated to two universities: the University of Brighton in the UK, and Tshwane University of Technology in South Africa. She can be contacted at:

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CAAST-Net partner activity

Promoting astronomy partnerships between Europe and Africa

James King, policy analyst at Intelligence in Science

On 31 May 2011 the South African Department of Science and Technology hosted a high-level conference in Brussels to promote astronomy partnerships between Africa and Europe and highlight how such cooperation can significantly advance excellence in global frontier research. South African minister of science and technology, Naledi Pandor, delivered the keynote address and expressed her desire for Europe to assume a greater role in helping to advance science and innovation across Africa.

Pandor also reflected on the growing role of science in the Africa-European Union relationship and the general recognition that science and research and development (R&D) must be at the centre of economic development. In this regard, South Africa's new Innovation Plan has stressed the importance of human capacity building in the development of new science partnerships, and the minister emphasised the efforts taken by her government to produce a new generation of African scientists. Such efforts have been most evident in the field of astronomy, where Africa enjoys numerous comparative advantages. The minister reiterated her priority to develop astronomy-based infrastructures as a means of promoting African science and research.

In addition, the event presented new African astronomy projects such as the MeerKAT radio telescope and the planned Africa VLBI Network as well as the exciting cooperation opportunities they offer to Europe.

Speakers alongside Pandor included Jean-Pierre Ezin, commissioner for the Human Resources Science and Technology of the African Union, who affirmed the African Union's support of science initiatives with Europe and called for greater cooperation with Africa under the European Union's next Framework Programme. Ezin also pointed to the promising initiatives already established by the African Union, including the launch of a research grant project promoting collaborative research awards for individuals and female participation in science.

The conference's second panel also focused on how astronomy partnerships contribute to human capital and socio-economic development, enable innovation and technological spin-offs, and support sustainable development. George Miley, vice-president of the International Astronomical Union, spoke of the need to encourage 'Astronomy for Development' programmes and argued that astronomy is linked to three key pillars of advanced development: technology, scientific research and culture. Miley also argued for the necessity of establishing an 'Astronomy for Development' call within the next European Union Framework Programme.



The group of distinguished speakers also included Marcel Van de Voorde of the Max Planck Society and Andy Cherry of the Association of Commonwealth Universities. Other distinguished speakers included Roy Booth, associate director of MeerKAT for science operations, and Val Munsami, deputy-director for research, development and innovation at the South African Department of Science and Technology.

The event concluded with a question and answer session involving participating speakers. A key theme to emerge from this session focused on the need for African partners to adopt a more forthright approach to science on the continent and present their case with greater vigour to Europe. In particular, it was argued that Africa should demonstrate the key aspects of human capital and socio-economic development that emerge from research and innovation, alongside the exclusively scientific benefits such partnerships can deliver.

Profile

James King is a policy analyst at Intelligence in Science (ISC), covering issues relating to space research and Africa-EU science cooperation. In this role, he evaluates Framework Programme calls for proposals and EU level legislation, while contributing to client projects through engagement with policymakers and the development of communication strategies. Currently, his efforts are focused upon radio astronomy projects in Africa and the growth of global science partnerships with research centres across the continent. Prior to joining the ISC, James obtained a master's in conflict, security and development from King's College London, before working in the intelligence department of a political risk consultancy.

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* Photograph provided courtesy of professional photographer Maud Harribey. Naledi Pandor, South African minister of science and technology, speaking, with Avril Doyle, former member of the European Parliament, and Jean-Pierre Ezin, commissioner for the Human Resources Science and Technology of the African Union, seated at the panel.

A healthy Africa needs research in cancer and diabetes

A research agenda on non-communicable diseases for Europe and Africa needs to focus on cancer and diabetes, a report published by CAAST-Net has said. The increased prevalence of cancer and diabetes in Africa underpins the need for research into the diseases' causes, prevention and treatment, and bi-regional cooperation can play a valuable role in addressing these issues.

The report included suggestions for collaborative research topics between Europe and Africa.

Joris Delanghe, from the department of clinical biology, microbiology and immunology at Ghent University Hospital in Belgium, suggested research into the relation between dietary iron overload and increasing prevalence of diabetes in Africa. The impact of such research, said Delanghe, would

be better insight in pathogenesis of diabetes in Africa – helpful in designing better-tailored prevention programmes and detection programmes for diabetic target organ damage (diabetic nephropathy). Delanghe is also an editor-in-chief of the international journal of clinical chemistry and diagnostic laboratory medicine, *Clinica Chimica Acta*.

Carl Albrecht, the head of research at the Cancer Association of South Africa, suggested research to follow-up evidence that the local rooibos tea can help reduce cancer. Albrecht also suggested research to seek ways of preventing colon cancer.

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Potential for energy research collaboration between the EU and Africa

Five potentially fruitful areas of collaboration in energy research between Africa and the European Union (EU) have been outlined in a CAAST-Net report. The report, which was prepared by South Africa's Department of Science and Technology (DST) and the Association of Commonwealth Universities (ACU), is entitled Potential for Energy Research Collaboration between EU and Africa, and is based on a CAAST-Net energy thematic workshop held in Sénégal in May 2009.

However, such collaboration, in order to succeed, needs a champion, which could be a research institute, a regional entity, or a specific country in a model similar to the network suggested by the NEPAD Consolidated Plan of Action. Below are some suggested targeted areas of collaboration, which are based in part on pragmatic utilisation of Africa's natural resources:

1. Biofuels

The area of biofuels includes improved conversion rates for first-generation technologies and alternative energy products from first-generation technologies; second-generation technologies for converting biomass to fuel; and feedstock production, including economic modelling and sustainable production of feedstock. Research in these areas must build capacity for Africa's decision-making capabilities to ensure that its resources are used sustainably and new biofuels industries address specific challenges such as rural economic empowerment.

2. Solar energy research

The solar energy research includes photovoltaic cells (which convert solar radiation into direct current electricity using semiconductors), concentrated solar power (which uses mirrors or lenses to concentrate a large area of sunlight within a small area, and use the resultant heat to activate an engine or turbine) and solar-powered water heaters. Two countries, Egypt and South Africa, have advanced plans to commission concentrating solar power plants, but the use of photovoltaic cells for rural electrification and solar-powered geysers remains low in these countries, largely because of relatively high manufacturing costs and low skills base for the installation and maintenance of this technology.

3. Energy-efficient technologies

Some African economies are sometimes even more energy intensive than other economies. Other African economies remain highly energy intensive, in comparison with other parts of the world. Particularly in transport, energy efficiency would help lower the negative impacts on the environment. Energy-efficient lighting is also needed.

4. Carbon capture and storage

In a country such as South Africa, coal is the largest source of energy. Coal is a fossil fuel implicated in climate change as its burning releases large amounts of heat-trapping carbon dioxide gas into the atmosphere. Research that would allow commercial-scale deployment of carbon capture and storage technologies is being undertaken by South Africa's energy research institutes and industries. Collaboration with other African countries and the EU will help accelerate learning, sharing of knowledge and production of new knowledge from the unique geologies.

5. Hydrogen and fuel cell technologies

Although the South African Department of Science and Technology (DST) has a National Hydrogen And Fuel Cell Technologies Research, Development and Innovation Strategy, in general, Africa has very limited research capacity in this area.

The data from the energy theme of Framework Programme Seven (FP7) indicated that only ten out of 561 projects submitted had a partner from the ACP (Africa, the Caribbean and the Pacific) or from those parts of Africa which are not part of the ACP. In the section on identifying and overcoming barriers to renewable energy research collaborations, the report warned that the barriers thus far identified came from the South African scenario, and required extensive input from other African countries before the list could be described as comprehensive.

Barriers to energy research collaboration

One barrier to energy research collaboration that has been examined in detail by CAAST-Net is the dominance of well-established energy research groups in South Africa in comparison with other countries on the continent. Such energy groups have strong networks with established research groups from Europe who have previously participated in Framework Programme activities and such mutually-beneficial partnerships have matured to the point now where there is good research funding and good partnerships with industry, hence proposals by such groups always 'win'. Even with these relative advantages, South Africa's participation in FP7 has been very limited (and discouraging). The identified barrier is that such networks are not available to young researchers or researchers in other countries.

In addition, new researchers are discouraged from partnering with other young researchers in the EU due to the high level of competition for the funding, which leads to another barrier: the perception that the bureaucracy required in the Framework Programme is too onerous, even though the Europe-based project leader has the most intensive reporting requirements. Given a choice, even well-established South African researchers prefer applying for research funding from other sources, such as industry.

The hosting of a EU-SA flagship project in South Africa would enhance the appetite for international cooperation and compensate for another identified barrier: the fact that most key research activities are hosted outside South Africa, thereby excluding young researchers once again. The final barrier would be the lack of research resources in Africa: human, financial and infrastructure resources are lower in South Africa compared to the targeted collaboration partner, the EU.

Energy research: the way forward

A detailed list of research priorities is contained in the Potential for Energy Research Collaboration between EU and Africa report, some of which have been touched on already in this article. Others include developing a pan-African databank of energy research and technologies, particularly for bio-energy, and setting up a harmonised data system suitable for scenario modelling. Assistance with renewable energy funds and trade-able renewable energy certificates, Energy Service Company (ESCO) business models, project finance matchmaking and helping governments with regulatory policies are listed among the detailed list of research priorities.

A healthy Africa needs research in cancer and diabetes

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According to the association, one in every 83 South African men is at risk of getting colorectal cancer while the rate for women is one in 131. Yet, funding for research in the area still remains low. Health research in Africa is heavily dependent on donor funding which prioritises infectious diseases.

For many years now international donors have focused almost exclusively on HIV/AIDS, TB and malaria, probably due to the fact that these diseases are more prominent in sub-Saharan Africa than in any other part of the world.

However, what has been largely neglected is the fact that the disease pattern

in sub-Saharan Africa is rapidly changing and many countries are facing a growing threat from non-communicable diseases.

The situation will only change when African leaders take adequate steps to include health, health research and education as important priorities in their political agendas.

Prioritising non-communicable diseases in the health research agenda of Europe and Africa will also help raise awareness and provide funding.