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Network for the Coordination and Advancement of
Sub-Saharan Africa-EU Science and Technology Cooperation
A five year joint Africa-EU S&T policy dialogue platform

RESEARCH INFRASTRUCTURES FOR AFRICA-EUROPE COOPERATION

Third CAAST-Net stakeholders' conference on Africa-Europe S&T cooperation in cooperation with PAERIP
Monday 3rd to Tuesday 4th of December 2012, Accra, Ghana
La Palm Royal Beach Hotel

SCENE-SETTING PAPER PREPARED FOR CONFERENCE PARTICIPANTS

INTRODUCTION

Optimally exploiting the important role played by research infrastructures as platforms to enrich science and technology output, is receiving increased attention from policymakers, also within the context of international cooperation. Not only do research infrastructures constitute essential mechanisms to support international research cooperation but they also often represent critical investments as part of global efforts to address key sustainable development challenges. Research infrastructures were therefore also recognized in the Second Action Plan of the Joint Africa-EU Strategy as a priority focus for Africa-EU science and technology cooperation. The Accra stakeholder conference is convened to examine how Africa-EU research infrastructure partnerships could be enhanced as part of the overall Africa-EU science and technology partnership to advance sustainable development.

For participants' background this paper will briefly set out a few key considerations with regard to the important direct and indirect impact of research infrastructure partnerships as instruments to support international cooperation, advance sustainable development and boost human capital development.

Before proceeding it would, however, be useful to clarify the definition of research infrastructures as those facilities, resources and related services that are used by the scientific community to conduct top-level research in their respective fields. Research infrastructures, thus, cover major scientific equipment or sets of instruments, e.g. telescopes or accelerators; knowledge-based resources such as collections, archives or structures for scientific information; enabling Information and Communications Technology-based infrastructures such as grid and high-performance computing, software and high-speed communication networks (known as e-Infrastructures), or any other entity of a unique nature essential to achieve excellence in research. Research infrastructures could be single-sited or distributed as part of a network of resources.

RESEARCH INFRASTRUCTURE PARTNERSHIPS TO SUPPORT INTERNATIONAL COOPERATION

Research infrastructures whether they are single large-scale facilities or instruments, networks, distributed infrastructures or e-infrastructure capacities are essential resources for all knowledge and innovation enterprises. In order to advance international science and technology endeavour, concerted coordination and cooperation is required in order to ensure the optimal availability of such resources to the global research community. In this context, if appropriately leveraged,

research infrastructures also have the potential to act as catalysts to advance international science and technology cooperation in their own right.

Global economic crises impact on the availability of resources for science and technology investment. This will accentuate the need for global partnerships with regard to research infrastructures, including joint financing, reciprocal access and networking, and other cooperation and coordination initiatives. Concomitantly such partnerships will also boost international science and technology cooperation enabling an enhanced policy dialogue between partners and more efficient utilization and investment of resources. A key principle would be for partner countries' respective comparative advantages, e.g. geographic, to inform for example decisions pertaining to the location of infrastructures. These are important dynamics for potential Africa-EU partnerships.

RESEARCH INFRASTRUCTURE PARTNERSHIPS TO ADVANCE SUSTAINABLE DEVELOPMENT

Global sustainable development challenges, including mitigation of, and adaptation to, climate change, protecting biodiversity, fighting poverty-related communicable diseases and ensuring food security, all require a collective and committed international science and technology response. Other than providing critical resources for discipline-specific work (e.g. bioinformatics, bio-imaging, genotyping or bio-bank infrastructures for the life sciences), research infrastructures also contribute to enabling a vital multi-disciplinarian approach. An example of the latter is the bettering of our understanding of Earth system dynamics, through coordinated Earth observation capacities coupled with modeling and simulation exercises. Research infrastructures in this manner also play an important role in providing science-based advice to inform policy- and decision-making.

The success of programmes such as the Global Earth Observation System of Systems (GEOSS) of the Group on Earth Observations is an excellent example of what can be achieved through targeted partnerships. GEOSS not only enables improved coordination and integration of national and regional capacities, as part of an international programme, but also identifies and enables, new investments, which are required to enhance global observation capacities. It is a multi-disciplinarian science-driven partnership, focused on harnessing Earth observation to address challenges in different societal benefit areas, including food, health and the environment. The GEOSS example is also mirrored by new infrastructures such as for example the LifeWatch biodiversity data observatory, which integrates through a holistic approach, research capacities related to ecosystems, species information, time/evolution, questions of scale, DNA/proteins/genes, etc.

It is significant that the revised version of the European Strategy Forum on Research Infrastructures' (ESFRI) "Roadmap" of priority research infrastructure projects, include a greater focus on infrastructures to support health, food and energy research. Investments in projects such as laboratory infrastructure for carbon dioxide capture and storage should indeed be at the heart of the sustainable development agenda. It should also be borne in mind that the development of new research infrastructures can not only serve to boost innovation, but can also serve as procurement instrument for investment in environmentally-friendly technologies.

Effectively fighting poverty, protecting the environment and ensuring sustainable growth is dependent on markedly increased and more efficient knowledge and innovation investment. Research infrastructures should form a central part of these strategies, especially so as they can also serve to strengthen multilateralism, global partnership and stability, as demonstrated by "peace projects" as the Sesame synchrotron light source partnership in the Middle East.

Research infrastructure partnerships can also boost socio-economic development. This is important since funding options for major global research infrastructure development also involve a careful cost-benefit analysis, with the return on investment not only measured in terms of exclusive science and technology orientated criteria, but also with regard to socio-economic development.

Research infrastructure development for example often also includes major services infrastructure development and frequently is a significant boost for employment creation in the area where the infrastructure is created. The interface of research infrastructure funding with for example public procurement, regional development, social cohesion or overseas development assistance is therefore an important policy consideration for Africa-EU cooperation. In appropriate circumstances this interface could even serve a driver for new research infrastructure partnership funding instruments.

RESEARCH INFRASTRUCTURE PARTNERSHIPS TO ADVANCE GLOBAL SCIENCE AND TECHNOLOGY CAPACITIES AND HUMAN CAPITAL DEVELOPMENT

Research infrastructures could help to leverage contributions from a broader global community for scientific enterprise. This is valuable since increased international cooperation is essential for global scientific advancement. Whilst most major global research infrastructures involve comprehensive international networks of researchers, these networks could be expanded and significantly enriched by actively promoting the participation of research communities from regions such as Africa, often excluded from these enterprises, due to historical non-participation or constraints such as limited communications connectivity.

Research communities in developing countries often have unique and rich contributions to offer, for example in dealing with global environmental challenges (climate change, biodiversity protection, etc.) Whilst global research infrastructures will always primarily be advanced by a core group of voluntary partners, concerted efforts to broaden the range of international participants, especially from developing countries, will add significant value to such projects. In this context, ensuring an internationally balanced distribution with regard to the location of major facilities will also play a significant role, and not only symbolically, to promote globally inclusive projects.

Research infrastructure partnerships contribute to human capital development by serving as flagship projects to raise interest of the youth and public in science and by promoting more equitable global brain circulation. Research infrastructure projects play an invaluable role in focusing the attention of not only policy- and decision-makers, but also of the broader public on science and technology. They can therefore also be an excellent vehicle for encouraging the youth's interest in science and technology careers. There is most promising potential to develop exciting science and technology education programmes concurrently with infrastructure projects.

Another important contribution such projects can render is to support raising public awareness and understanding of science and technology and its contribution to society. Global research infrastructure projects enjoy "flagship" status, largely as a result of their scope (e.g. focused on global challenges or frontier research such as astronomy projects) and their large scale, and concurrently also command high levels of public interest.

While international scientific mobility is fundamental to the development and evolution of a global science system and enterprise - and, indeed, of science itself - negative impacts of increased mobility will be more strongly felt by developing nations than developed ones in the form of a long-term, net outflow of human resources. This will further deepen the existing dissymmetry in science between developed and developing countries, eroding progress toward a global science enterprise and undermining the growth of science, which would surely be enhanced through full participation of human resources in developing countries, especially over the long-term.

This is the reason why the dissymmetry needs to be actively managed through important means such as the location of international science resources and infrastructures in developing countries. These considerations should play an important part in the global research infrastructure discourse, including measures to facilitate access to international facilities for researchers from developing countries, where such facilities do not exist in their own countries.

CONCLUDING REMARKS

The analysis above demonstrates that research infrastructure partnerships can significantly enrich Africa-EU science and technology cooperation, notably by enhancing the bi-regional collaborative efforts to harness research and innovation for sustainable development and to boost human capital development. The Accra conference should interrogate and formulate recommendations how this potential can best be realized whether in terms of (i) Africa-EU partnerships to develop new research infrastructures, (ii) transnational access programmes for researchers to African and EU infrastructures or (iii) collaboration networks between African and EU infrastructures. The conference outcomes will be presented to policymakers designing the next generation of Africa-EU cooperation instruments, with the objective to ensure a greater focus on and support for research infrastructure partnerships.

QUESTIONS AMONG OTHERS, WHICH PARTICIPANTS COULD CONSIDER AS PART OF THIS DEBATE, INCLUDE

1. How can we ensure research infrastructures is a high priority on the future Africa-EU S&T cooperation policy and funding agendas, especially against the background of many competing priorities?

2. In order to ensure funding and political support, do we need a greater societal debate on the utility of Africa-EU research infrastructure partnerships with a greater emphasis on their economic application?

3. Could innovative Africa-EU public-private partnership models be considered for new research infrastructures, including as part of efforts to promote “open innovation”?

4. In the light of their important role in stimulating innovation, should Africa-EU research infrastructure partnerships also not be financed through development cooperation and other economic development instruments?

5. How can we facilitate the often complex transnational access procedures to African and European research infrastructures for African and European researchers respectively?

6. Which Africa-EU collaboration efforts are required to ensure the important data flow challenges posed by new research infrastructures, e.g. related to communication, processing and storage capacities, are met?