

## **Towards Innovation Systems for Sustainability - The Role of International Cooperation**

*Britta Rennkamp, Dr. Andreas Stamm*  
*German Development Institute (DIE), Bonn, Germany*

How can Science, Technology and Innovation (STI) contribute to achieving the Millennium Development Goals? Particularly Goal 1, reducing poverty, and Goal 7, to ensure environmental sustainability, are relevant for the policy dialogue on Sustainability Sciences.

Stocktaking exercises, such as the MDG report 2009, show that the global objectives are unlikely to be met. But to the extent they are, international science and technology policy will be crucial (UN 2009). To expand scientific and technological capabilities is crucial for economic growth in most developing economies, particularly in those countries that have established a domestic scientific basis.

In the implementation strategies so far, as the MDG reports show, it is striking that developing technological capabilities in developing countries and S&T cooperation are not explicitly addressed. The main debate around the MDG focuses on the allocation of ODA and leaves scientific and technological cooperation aside.

### ***Linking Science and Technology Cooperation with Development***

Robust cooperation lines have evolved over the last decades between South Africa and Germany in both development and in science and technology. Some dynamics of the last years may open important opportunities to use synergies between both forms of cooperation.

Science, technology and innovation has lost significance on the agenda of policy makers in the field of development cooperation since the 1960s. None of the focal areas for development cooperation in the German lead ministry refers explicitly to STI or to higher education. Most activities in the focal area related to education refer to basic education and vocational training.

The same tendency can be observed in the cooperation lines in Science and Technology. They tend to focus on co-funded partnerships with other industrialized countries. The government rarely funded STI cooperation with developing countries except for reasons of infrastructure or interesting natural research topics, e.g. native flora and fauna. As opposed to scientists and policy makers in the developing countries, 'Science and Technology' and 'Development Cooperation' were not thought together.

All governmental cooperation effort is supposed to be clearly committed to the Millennium Development Goals, approved by the global community in the year 2000. Unfortunately, this does not necessarily make it easier to advocate for a stronger role of STI or higher education in development cooperation.

Official German Development Cooperation has been channelling significant resources that may contribute to the building-up of scientific and technological capabilities, e.g. through a broad range of activities conducted by the German Academic Exchange Service. But for decades there was no strategic focus placed on this field of activities.

In recent years, the role of knowledge has again been acknowledged in development discourses. This shift has led to the approval, in May 2009, of a BMZ concept paper 'Knowledge for Development' (BMZ 2009).

This paper includes a commitment of German development cooperation to strengthen knowledge and innovation systems in the partner countries. It basically reflects an increasing awareness that strong knowledge and innovation systems are necessary for sustained economic growth and especially for a transition towards ecologically more sustainable growth patterns.

Another important framework paper, the Strategy for Internationalisation of Science and Research, initially developed by BMBF and adopted by the German cabinet in February of 2008, is particularly important for two reasons: First, it recognizes the need to enhance STI cooperation with developing countries, and second, stresses the role of STI to address global challenges (BMBF 2008).

Finally, mitigation of – and adaptation to – climate change is a topic that is given high priority within German development policy. Whatever the concrete outcome of the Copenhagen summit will be, the topic of technology and innovation in response to climate change will heavily influence the debate from 2010 onwards.

In short, Scientific and technological cooperation on the one hand, and development cooperation on the other, can clearly be complementary to each other in the attempt to strengthen innovation systems in the partner countries.

***The way forward: creating strategic STI – fostering Sustainability oriented innovation systems (SoIS)***

How can cooperation in STI best be organized to address the global challenge of sustainable development? A useful approach to explain the determinants and dynamics of technological innovation is the innovation systems approach that focuses on the interaction of firms, governmental actors and researchers. So far, sustainability and environmental conflict has not been systematically integrated into this approach. Sustainability oriented innovation systems can be defined as networks of private and public actors who produce market innovations that reduce pressures on the environment (Stamm et al. 2009). Following the assumption that (global) public goods are under-supplied, SoIS differ from conventional innovation systems by attributing a more important role to policy (Fischer and Rennkamp 2009). Two reasons can explain this, first, a private company will usually not exploit all of the benefits from investment in innovation activities (non-appropriability); second, environmental costs continue to be largely externalised.

In consequence, three policy types are necessary:

- i) demand side policies* that help to create markets. These can be regulations that obligate the use of a certain environmental technology i.e. solar water heaters
- ii) supply side policies* are important to create the infrastructures for public science, research and development and human resources. These are necessary to build the knowledge and technological capability to create and adapt innovations. They differ in their explicit focus on the creation of environmentally relevant scientific knowledge and engineering capacity.

- iii) *closely coordinated international cooperation* to enhance the effects of both. Whereas STI cooperation focuses on the creation of new knowledge, it can contribute to strengthen technological capability and the demand side. Development cooperation is usually applied on the demand side, too, assuming a strong role in education and capacity building. But it can be useful in strengthening the supply side, too. Examples are feasibility and foresight studies, policy consultancy to the formulation of regulation mechanisms as well as initial funding for the introduction of new technological solutions to bridge the long way from an invention into market innovation.

**References:**

BMBF (2008) *Deutschlands Rolle in der globalen Wissensgesellschaft stärken - Strategie der Bundesregierung zur Internationalisierung von Wissenschaft und Forschung*. Bonn/ Berlin.

BMZ (2009) *Wissen für Entwicklung: Hochschulbildung und Wissenschaft in der deutschen Entwicklungspolitik - Ein Positionspapier des BMZ*. Bonn / Berlin.

Fischer, Doris, and Britta Rennkamp (2009): *Addressing global challenges – New approaches and governance mechanisms for multinational science and technology cooperation*. paper presented to OECD, CSTP Workshop, March 2009, Paris.

Stamm, Andreas, Eva Dantas, Doris Fischer, Sunayana Ganguly, and Britta Rennkamp (2009) *Sustainability Oriented Innovation Systems - Towards Decoupling Economic Growth from Environmental Pressures*. In *DIE Discussion Papers*, Ed. DIE. Bonn German Development Institute.

UN (2009): *The Millennium Development Report*. Ed. United Nations Department of Economic and Social Affairs (DESA). New York.

**Contact:**

email: [britta.rennkamp@die-gdi.de](mailto:britta.rennkamp@die-gdi.de), [andreas.stamm@die-gdi.de](mailto:andreas.stamm@die-gdi.de),  
website: <http://www.die-gdi.de>