

## Enhanced Action on Technology Development and Transfer

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## **I. Overall Context**

### ***1.1 Overview***

1. The Bali Action Plan called for enhanced action on technology development and transfer to support action on mitigation and adaptation. The action plan covers: (i) mechanisms to accelerate deployment, diffusion and transfer of affordable environmentally sound technologies; (ii) cooperation on research and development of current, new and innovative technology; (iii) mechanisms and tools for technology cooperation in specific sectors, including sectoral approaches; and (iv) measuring, reporting and verification of technological support to developing country Parties.

2. The Nairobi AMCEN Declaration (May 2009) highlighted technology development and transfer as critical to the achievement of both adaptation and mitigation in Africa and furthermore identified specific areas of focus such as: (i) hard technologies (e.g., drip irrigation, water harvesting, drought-resistant crop varieties, renewable energy etc.) and soft technologies (e.g., knowledge, systems, procedures, and best practices); (ii) barriers to technology transfer including trade rules, intellectual property rights and technical barriers e.g. standards and eco-labeling); (iii) capacity building in African countries to foster the development and local manufacture of cleaner mitigation and adaptation technologies; and (iv) technology cooperation between African countries and other countries/regions of the world.

### ***1.2 Current Setup and Progress on Technology Transfer for Climate Change***

3. Currently, in the context of the UNFCCC, the Global Environment Facility (GEF), as an operational entity of the financial mechanism under the Convention, is mandated to provide financial support for technology transfer. In addition, the Conference of Parties has established the Expert Group on Technology Transfer (EGTT) with the “objectives of advancing the development and transfer of technology activities under the Convention”.

4. The GEF-led strategic program on technology transfer<sup>1</sup> provides financing support for: (i) technology needs assessments (TNAs); (ii) technology transfer pilot projects; and (iii) dissemination of technologies and practices. A recent GEF report on investment for technology transfer shows that a number of African countries have benefitted from GEF-coordinated transfer of environmentally sound technologies (ESTs), notably in the areas of energy efficiency, renewable energy and transport technology such as bus-rapid transit systems. But assessing technology transfer for adaptation to climate change has been more problematic. Thus while “hard technology transfer” plays an important role in mitigation, in adaptation, it is the combination of “technology, techniques and practices<sup>2</sup>” supported by “information and skills”. For instance, in agriculture, many forms of adaptation will be concerned with transfer and diffusion of management practices and related knowledge, traditionally provided through agricultural extension services.

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<sup>1</sup> Also known as the Poznan Strategic Program on Technology Transfer.

<sup>2</sup> Thus the term “soft technologies” used in the AMCEN Declaration.

5. Much of the work of the EGTT on the development and transfer of technologies has been more at a conceptual level with a focus on technology needs assessments, enabling environments and mechanisms for technology transfer. Over 70 technology needs assessments (TNAs) have been completed of which some 15 for African countries to help to identify and determine the mitigation and adaptation technology priorities<sup>3</sup>. More recently, the EGTT has begun to address more practical issues covering: (i) innovative options for financing the development and transfer of technologies including ways to engage the private sector; (ii) more emphasis on knowledge and understanding of adaptation to climate change including local technologies and practices; and (iii) the development of performance indicators to help to monitor and evaluate the effectiveness technology development and transfer.

6 A review of the TNAs<sup>4</sup> revealed that for African developing countries, technology needs for adaptation are most relevant for agriculture (mainly for crop management, land management, efficient irrigation and improved livestock husbandry), water conservation, harvesting, storage and transfer, forest rehabilitation and amelioration technologies) and in the health sector, the need for improved health infrastructure and services. In mitigation, the technology needs most frequently identified by African countries cover renewable energy, energy-efficient appliances and buildings, efficient crop and land management and public transport. The energy and agriculture sectors offer the largest potential for the transfer of ESTs. With very low access to modern energy (less than 25% of households), energy generation is the main challenge and the most commonly identified technology needs for mitigation related to solar photovoltaic technology (grid connected and off-grid); biomass (forest residues and communal bio waste); large, small and micro-hydropower plants; efficient lighting and water heating (solar and biomass); water pumping (solar and wind); efficient fuel-conserving stoves and ovens (solar, charcoal and biomass); and solar drying of agricultural products. Also, given the growing risk to Africa's coastline from the projected sea level rise, adaptation technologies and related software for coastal populations, urban areas and ports will be critical.

7 The main barriers to technology transfer identified were economic and market barriers (e.g. lack of financial resources and undeveloped infrastructure). High investment costs and incompatible prices, subsidies and tariffs were also considered to be important economic and market barriers. Other important barriers to technology transfer identified included lack of information and awareness regarding ESTs and lack of institutional, regulatory and human capacity to successfully tackle the technology transfer process.

### *1.3 Status of Negotiations on Technology Transfer*

8 The limitations of the current technology framework are broadly shared by all countries. From the perspectives of developing countries, barriers to technology transfer are multi-faceted and include inadequate technology information; limited skills to manage and adapt technologies; lack of an enabling environment including the issue of IPRs; lack of financing or access to credit; high cost of technology and insufficient investment. Developed countries stress the importance of the role of the private sector and research institutions, and on enhancing enabling environments for technology transfer. The important role of public finance in supporting technology research and development to leverage private sector investments has attracted much attention.

9 Intellectual property rights (IPRs) constitute a major divide in the climate negotiations with developing countries seeing IPRs as a barrier to technology transfer and developed countries stressing the role of IPRs in promoting innovation hence the need to find a balance between rewarding innovators and

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<sup>3</sup> An African regional workshop on preparing technology transfer projects for financing is scheduled for September 2009 in Botswana with the aim to enhance the capacity of project developers in Africa to convert project ideas resulting from TNAs into project proposals that can meet the standards of international financial providers.

<sup>4</sup> UNFCCC, "Second synthesis report on technology needs identified by Parties not included in Annex I to the Convention - Note by the Secretariat (June 2009).

greatly scaling up technology diffusion and transfer. Several measures to overcome IPR barriers have been on the table for a long time including patent buy-outs, reduction of tariffs on sale of technologies, a global clean-energy venture capital fund, transfer of technologies to public domain, licensing schemes with reduced duration of intellectual property rights, and flexible technology transfer mechanisms. However, these have not come up for serious discussions in any international forum, thus lessening prospects for concrete agreements.

10 A more fundamental issue concerns the institutional framework for technology with two approaches (i) the continuation of existing arrangements and mechanisms enhancing financial and technology cooperation favoured by developed countries and (ii) the call by developing countries (G77 and Africa) for establishing a new technology mechanism to guide overall technology development and transfer activities under the Convention.

11 The current negotiating text puts strong emphasis on the future arrangements for technology development and transfer. One option being proposed would consist of scaling up existing and emerging financing arrangements to be implemented by various bilateral and multilateral institutions outside the Convention. Under the alternative option, which closely follows the G77 proposal, a new international technology financing scheme would be established under the Convention with a mandate to scale up collaborative action on technology development and transfer, covering all stages of technological maturity. It would play a significant catalytic role in supporting the efforts of developing countries in the research, development, deployment, diffusion and transfer of technologies for mitigation and adaptation.

## **II. Africa's Concerns and Expectations<sup>5</sup>**

12 The African Group submissions for the negotiating text include:

- Developed countries commit to the full cost for the deployment, diffusion and transfer of technology to developing countries together with finance and capacity building for urgent and immediate adaptation actions in developing countries;
- Use the performance indicators for technology transfer developed EGTT to further enhance the measurement, reporting and verification of technology support;
- Address more directly the barriers to technology transfer; and
- The establishment of a new technology mechanism coherent with the G77 approach.

13 Relative to other developing regions, barriers to technology transfer such as inadequate technology information, limited skills, and the lack of an enabling environment and of financing and insufficient investment are even more acute in Africa.

Furthermore, climate change could pose important challenges to broadening energy access and security in Africa. At the same time, preserving and increasing African forest areas could be an important component of global actions to curb emissions, thus creating a potential tension between the continued increase in demand for fuel wood as a source of energy, and the desire to protect Africa's forests.

14 On the positive side, there is the potential for large-scale solar power installations in part of Africa and particularly in North African countries with the possible solution is to connect North African generation to stable demand markets in Europe. There is also a huge potential for hydropower generation from many river systems in Africa, particularly the Congo River with the EGAT project being one of the priority projects identified in the NEPAD Infrastructure programme. There is also a largely untapped geothermal energy potential in eastern Africa and more particularly in Kenya.

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<sup>5</sup> The submission by Algeria to the UNFCCC on behalf of the African Group is available at <http://unfccc.int/resource/docs/2009/awglca6/eng/misc04p01.pdf>

14 xCompared to other developing regions of the world, water planning and management in Africa is more integrally linked to energy (with only 7% of the hydropower potential exploited) and agriculture (less than 7% of arable lands are irrigated). The fact that almost all of the major African river basins are transboundary adds to the complexity of designing and implementing projects. The need for a regional approach to power generation and distribution has been clearly recognised and subregional power pools have been established covering all parts of the continent. Support for river basin organizations that enjoy economies of scale in developing and implementing technology plans will be critical.

15 Finally, given the large share of agriculture in most African economies, the overwhelming reliance on rainfed agriculture which greatly intensifies climate risks in this sector – leading to significant concerns on food security – much more efforts should be extended to agriculture technology (climate resilient crops, irrigation tools).

### III. Progress on Capacity Building and Impact

16 The COP has given the GEF direction to help support *inter alia* capacity building. Through the TNA process, countries identified a number of activities that could now be considered for further funding either through the GEF or other programmes developed as part of the enhanced framework. They include efforts to: train key personnel in technology issues, train installers, create technology transfer centres, develop courses and research initiatives, establish national and regional technology networks, and move towards technology market assessments.

17 As reported in the review of TNAs, most countries indicated that existing in-country capacity is insufficient to address the transfer of ESTs. Commonly identified needs included those relating to access to information and awareness-raising; human, institutional and organizational capacity; implementation of policies and programmes; implementation and enforcement of appropriate regulations; and economic, market and infrastructure capacity. Capacity development is also required to familiarise country officials with information about the benefits of using ESTs and funding opportunities to support the implementation of ESTs. Support for capacity building will also need to be synthesized on a sub-regional basis, as these needs differ depending on the focus of each region and could include the need for: (i) enhancing national policies and legal and regulatory environments in the context of regional approaches and (ii) regional initiatives for the development of skilled human labour to develop local solutions and foster international cooperation.

18 A recent GEF<sup>6</sup> report on investment for technology transfer highlights the large differences between countries and regions, with some developing countries at the forefront of innovation and technology diffusion in a particular sector. This points to the heterogeneity among “developing countries” in technology transfer and diffusion, and therefore to the necessity of different responses to facilitate technology transfer. On *mitigation*, the review shows that a number of African countries have benefitted from transfer of technology, notably in the areas of energy efficiency (such as lighting, light-emitting diodes); renewable energy (such as small solar rural electrification, geothermal and small hydropower projects); and transport technology such as bus-rapid transit systems. Assessing technology transfer for *adaptation* to climate change has been more problematic and is due to the nature of adaptation itself: climate change adaptation activities are difficult to separate from other development activities, as adaptation is inextricably linked to development.

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<sup>6</sup> UNFCCC (2008), Report of the Global Environment Facility on a strategic programme to scale up the level of investment for technology transfer, Note by secretariat FCCC/SBI/2008/5

#### **IV. Recommendations to Parties**

##### ***African Governments***

- Strengthen and use the regional networks of information and knowledge-sharing , including training (regional, sub-regional, training of trainers), mentoring, and learning-by-doing approaches.
- Identify indigenous technology relevant to climate change adaptation and mitigation that could be scaled-up and replicated together with incentives for such action
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- Recognize the importance of enabling environments to facilitate and promote the engagement of the private sector in the development and transfer of technology.

##### ***Developed country Parties***

- Assist African countries in completing Technology Needs Assessments and support the diffusion and transfer of technology in areas of particular relevance to Africa such as REDD, land use, and small-scale renewable energy (i.e. hydropower and rural electrification) and technology on adaptation.
- Take into account the important role of public finance in supporting technology R&D and promote innovative IPR regimes to promote technology transfer and deployment in developing countries.
- Support Africa's efforts to promote and facilitate the gathering and sharing of climate information through South-South collaboration on adaptation including through ClimDev-Africa and its African Climate Policy Centre (ACPC).