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**SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE**

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**Item 3 of the provisional agenda**

**Nairobi work programme on impacts, vulnerability and adaptation to climate change**

**Item 4 of the provisional agenda**

**Development and transfer of technologies**

**Report on the joint expert meeting on technologies for adaptation  
to climate change**

**Note by the secretariat\***

*Summary*

This document provides a summary of the expert meeting on technologies for adaptation to climate change organized under the Nairobi work programme on impacts, vulnerability and adaptation to climate change. The meeting was held in Bangkok, Thailand, on 5 April 2008. Discussions at the meeting focused on technologies for adaptation in different sectors and at regional, national and local levels, experiences and lessons learned, and possible elements for the future programme of work on technologies for adaptation. This document also contains issues for further consideration.

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\* This document was submitted after the due date owing to the timing of the meeting.

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## **I. Introduction**

### **A. Mandate**

1. The Conference of the Parties (COP), at its thirteenth session, requested the secretariat to organize, as an input to the Nairobi work programme on impacts, vulnerability and adaptation to climate change, a meeting on technologies for adaptation with experts involved in this work and in the activities of the Nairobi work programme and national adaptation programmes of action, to be held before the twenty-eighth session of the Subsidiary Body for Scientific and Technological Advice (SBSTA).<sup>1</sup>

### **B. Scope of the note**

2. This report contains information on the expert meeting referred to in paragraph 1 above. It draws on the discussions and presentations made at the meeting, including on possible next steps under the Nairobi work programme.

3. As requested by the SBSTA,<sup>2</sup> this document contains:

- (a) An analysis of the issues addressed, including current status and lessons learned (chapter III);
- (b) A summary of identified gaps, needs (including any capacity needs), opportunities (including possible synergy among activities), barriers and constraints (chapter III);
- (c) A summary of recommendations (chapter IV).

### **C. Possible action by the Subsidiary Body for Scientific and Technological Advice**

4. The SBSTA may wish to consider the information contained in this document as part of its consideration of further activities related to technologies for adaptation to climate change under the Nairobi work programme.

### **D. Background**

5. The overall objective of the Nairobi work programme is to assist all Parties, in particular developing countries, including the least developed countries and small island developing States, to improve their understanding and assessment of impacts, vulnerability and adaptation, and to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account current and future climate change and variability.<sup>3</sup>

6. Activities in the area of technologies for adaptation to climate change under the Nairobi work programme are undertaken in line with the objective stated in the annex to decision 2/CP.11 to advance sub-theme (b) (iii), "Promoting research on adaptation options and the development and diffusion of technologies, know-how, and practices for adaptation, particularly addressing identified adaptation priorities and building on lessons learned from current adaptation projects and strategies".

7. The SBSTA, at its twenty-fifth session, also agreed as part of its consideration of further activities under the Nairobi work programme to take into account the synthesis of technology needs

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<sup>1</sup> FCCC/CP/2007/6, paragraph 79 (b).

<sup>2</sup> FCCC/SBSTA/2006/11, paragraph 24.

<sup>3</sup> Decision 2/CP.11, annex, paragraph 1.

assessments (TNAs) for adaptation,<sup>4</sup> information relating to technologies for adaptation in national communications (NCs) and NAPAs, the technical paper on the application of technologies for adaptation<sup>5</sup> and relevant deliberations by the SBSTA.

8. In response to a request by the SBSTA at its twenty-fifth session,<sup>6</sup> the secretariat prepared a report that synthesized information and views submitted by Parties and relevant organizations on technologies for adaptation to climate change at regional, national and local levels in different sectors.<sup>7</sup> The report also synthesized views on needs for, concerns with, and experiences and lessons learned from developing, deploying and transferring such technologies and identified issues for further consideration.

## II. Proceedings

9. The secretariat, with the assistance of the Ministry of Natural Resources and the Environment of Thailand, organized the joint expert meeting on technologies for adaptation to climate change on 5 April 2008 in Bangkok, Thailand. Ms. Helen Plume, Chair of the SBSTA, chaired the meeting.

10. The meeting was attended by 37 participants, comprising: representatives from Parties, the Expert Group on Technology Transfer (EGTT), the Least Developed Countries Expert Group (LEG), relevant intergovernmental organizations and non-governmental organizations (NGOs), and individual experts.

11. The objectives and expected outcomes of the expert meeting were:

- (a) To further identify and evaluate technologies for adaptation by sector and at regional, national and local levels;
- (b) To develop a programme of further actions that could be undertaken to continue previous work on technologies for adaptation under the Nairobi work programme;
- (c) To harmonize and consolidate findings on technologies for adaptation for various processes and programmes such as national development plans, NCs, NAPAs and TNAs.

12. The meeting agenda was designed, in consultation with the Chair of the EGTT, to address issues relating to technologies for adaptation to climate change and transfer of technologies.<sup>8</sup> The meeting consisted of three sessions, as follows: (a) setting the scene; (b) technologies for adaptation in different sectors and at regional, national and local levels; and (c) possible elements for the future programme of work on technologies for adaptation to climate change.

13. Examples of potential activities on technologies for adaptation that were discussed at the meeting include:

- (a) Identifying needs for, concerns with, and experiences and lessons learned from successful development and deployment of technologies for adaptation by sector and at regional, national and local levels;
- (b) Enhancing technological cooperation to address technologies for adaptation to climate change (e.g. what such cooperation might involve, and what kind of institution is needed at national and global levels to enable transfer of and access to these technologies);

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<sup>4</sup> FCCC/SBSTA/2006/INF.1.

<sup>5</sup> FCCC/TP/2006/2.

<sup>6</sup> FCCC/SBSTA/2006/11, paragraph 56.

<sup>7</sup> FCCC/SBSTA/2007/6.

<sup>8</sup> The meeting agenda, presentations and list of participants are available at <<http://ttclear.unfccc.int/ttclear/jsp/>>.

- (c) Integrating the results of various processes and programmes such as national development plans, NCs, NAPAs and TNAs;
- (d) Strengthening human and institutional capacity, and promoting synergy with work carried out under other Conventions and under programmes on desertification and disaster reduction;
- (e) Exploring ways to encourage extensive communication and sharing of experiences using current technology (e.g. the technology information clearing house (TT:CLEAR) chat room).

### **III. Summary of the discussions**

#### **A. Setting the scene**

14. In welcoming the participants, the Chair of the SBSTA emphasized the importance of the expert meeting in facilitating a dialogue between experts, governments and NGOs on issues relating to technologies for adaptation and technology transfer. She emphasized the need to enhance technological cooperation with respect to the available technologies, and mentioned that both developing and developed countries have challenges to overcome before they can support appropriate research and development (R&D) on these technologies.

15. The secretariat introduced the Nairobi work programme and its objectives, and described possible roles and the specific actions Parties, organizations and the secretariat could undertake to enhance implementation of the programme. The presentation also emphasised the importance of engaging relevant organizations and stakeholders in order to integrate adaptation activities.

16. The Chair of the EGTT gave a brief overview of the work on the development and transfer of technologies under the Convention, highlighting the main activities under the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention (technology transfer framework) which was adopted by decision 4/CP.7 and complemented by both decision 3/CP.13 and earlier work by the EGTT on technologies for adaptation to climate change. He mentioned that many technologies for adaptation already exist (varying from hard to soft, simple to highly complex, inexpensive to unaffordable, and locally available to those requiring technology transfer) and that the policy implications of facilitating the diffusion and enhancement of technologies for adaptation, and development of new technologies via national and international mechanisms, will need to be discussed further.

17. The Chair of the LEG presented information on the need for specific technologies, and their relative costs, in the following sectors: coastal zone infrastructure; agriculture diversification and food security; livestock and rangeland; fisheries and food security; water resources; health; and disaster risk management and preparedness and early warning systems. He mentioned that more than 50 per cent of the NAPAs expected to be submitted have already been submitted and are available on the NAPA website.

#### **B. Technologies for adaptation in different sectors and at regional, national and local levels**

##### 1. Stocktaking on ongoing and planned activities on technologies for adaptation

18. The chair of the second session, an independent expert from the Stockholm Environment Institute (SEI), gave an introductory presentation on the technologies for adaptation, focusing on the role that technologies for adaptation can play throughout this process. He also provided examples of such technologies, as well as lessons learned from their application.

19. The process of adaptation includes four generic and recurring steps: information development and awareness-raising; planning and design; implementation; and monitoring and evaluation. Thus the process of adaptation begins and ends with information development.
20. Within this process there are two kinds of technologies for adaptation: technologies to implement adaptation actions; and technologies to facilitate the implementation of these actions, through information development, awareness-raising, and planning and design. Technologies for facilitating and implementing adaptation actions are soft technologies.
21. According to the chair, successful adaptation involves stakeholder action from the local level to the global level, and technology application and transfer are applicable at all levels. Technologies can be very important in reducing vulnerability to climate change, but they can also introduce new risks and their effectiveness depends on the economic, institutional, legal and socio-cultural environment in which they are applied.
22. Following the overview given by the chair, the secretariat summarized activities on technologies for adaptation undertaken within the UNFCCC process, in particular the TNA process (mandates, key activities and reporting results) which can form the basis for a portfolio of environmentally sustainable technology projects. The secretariat also presented an overview of technologies for adaptation which were identified by Parties in their TNAs and in the submissions referred to in paragraph 8 above, highlighting the main technologies by sector, identifying technology-related needs, concerns, experiences and lessons learned, and describing follow-up activities conducted by the EGTT.

2. Needs for, concerns with and experiences and lessons learned from the successful development and deployment of technologies for adaptation

23. The chair of the session highlighted several issues that emerged from the presentations to guide the discussion on: policy implications for development, deployment and diffusion of existing technologies; access to available technologies; types of barriers to overcome for successful implementation; and information needs and capacity-building needs to be met for relevant actors to use the technologies efficiently. The discussion that followed is summarized below.

*Adaptation planning tools and design*

24. Participants agreed that it is important to have access to existing climate information; this information can serve as input for planning models in order to develop national scenarios and, at a later stage, to select a particular technology. Many participants said that planning tools are available, but that they are not typically considered to be adaptation technologies. Tools and models are used by managers in several sectors to inform decision makers, and can be sector-specific or cross-sectoral. A major challenge, however, is to try to integrate these existing tools into the adaptation process.
25. Participants also agreed that a strong participatory process is needed for the successful implementation of adaptation technologies. This process may involve ensuring that local communities have ownership, engaging economic sectors and civil society, and using the administrative skills and management tools of the local decision makers.
26. The representative of the United Nations Industrial Development Organization stressed the need to aim for a “climate-proof economy”, which is crucial to the adaptation process. She said that the reported technologies reflect only the needs of some sectors such as agriculture, coastal zones and water sectors instead of covering the entire adaptation technology portfolio. She also said that to obtain an overview of adaptation needs, the entire spectrum of industrial, financial and planning agencies and institutions should be involved in the adaptation process.

*Possible approaches to technologies for adaptation and technologies for mitigation*

27. Some participants noted the need to clarify how technologies for adaptation are addressed in the technology transfer framework. They also noted that adaptation is a broad subject and that it is difficult to manage and categorize existing information flows, and to disseminate existing knowledge. Furthermore, adaptation places greater emphasis on the planning and development of human resources and capacity-building than does mitigation.

28. Participants discussed whether adaptation and mitigation should be considered separately or handled simultaneously. Some participants suggested that the implementation of adaptation and mitigation should be considered in different ways; others recommended that the same approach should be applied for both adaptation and mitigation, owing to the several similarities.

29. During the discussion, many participants agreed on the need to use a holistic approach to the adaptation process rather than a fragmented one. The experts also stated that it would be beneficial and cost-effective to focus on preventive adaptation measures ('proactive adaptation approach') instead of correcting what has already happened ('reactive adaptation approach').

*Mainstreaming of technologies for adaptation*

30. Several experts expressed a strong need for mainstreaming adaptation activities that are related to the development and transfer of technologies. According to these experts, adaptation should be mainstreamed at a policy level, and adaptation and technology transfer needs should be incorporated into regional, national and local planning schemes.

*Evaluation and monitoring activities*

31. The participant from Austria noted that the Nairobi work programme focal areas are linked to different stages of the adaptation process discussed in the session on stocktaking (see paragraph 19 above). He observed that: the focal area on data and observation is linked to information on technologies for adaptation; the focal area on methods and tools is linked to planning and design of adaptation; and the focal area on technologies for adaptation is linked to the implementation of technologies. He drew attention, however, to a lack of evaluation activities and therefore suggested that future work by the EGTT could address the matter of monitoring the effectiveness of adaptation activities.

*Maladaptation*

32. Some participants identified maladaptation as a negative aspect of the process of implementing adaptation technologies. It was noted that in order to avoid maladaptation, it is crucial that planners use reliable information and are aware of technological options while designing a project. The wealth of information available at this stage can help planners to visualize potential negative impacts. One expert also stated that an incorrect assessment of the costs and benefits of various adaptation techniques could result in maladaptation. The cost of each option should be known at the planning phase.

*Financing issues*

33. It was stressed several times throughout the discussion that the cost of adaptation will be very high in the future if adaptation needs are not prioritized. In order to decrease potential costs, decision makers at the national level should establish sound planning processes. More adaptation funds should come from the public sector than from the private sector, and innovative financing schemes specific to technologies for adaptation (as opposed to those used for mitigation) should be developed. It was noted

that the availability of financing for technologies for adaptation will influence the way in which existing scientific advice will be used.

34. The participant from Samoa noted that NCs and NAPAs provide comprehensive information on adaptation technologies and barriers to their implementation. With regard to financing, he said that market barriers to adaptation are different from those to mitigation and that funding sources for adaptation are much more limited.

#### *Capacity-building*

35. The participant from China observed that technology transfer includes both hard and soft technologies. She said that in this context, it is important to enhance the development of human resources, in particular those needed for the adaptation process. She also said that at every stage of the adaptation process, there is a strong need for human resources development and capacity-building, and that building institutional capacity at the local level might lead to enhanced local planning.

### **C. Possible elements for the future programme of work on technologies for adaptation to climate change**

36. The Chair of the EGTT presented the proposed work programme of the EGTT for 2008–2009 as mandated by decision 3/CP.13. He said that the EGTT is expected to play a catalytic role in facilitating the implementation of current activities under the technology transfer framework, and to develop medium- (2008–2012) and long-term strategies beyond 2012, including sectoral approaches, to facilitate the development, deployment, diffusion and transfer of technologies under the Convention.

37. He highlighted some challenging tasks for the EGTT, including the development of performance indicators to regularly monitor the effectiveness of the implementation of the technology transfer framework, and the identification and analysis of existing and potential financial resources for the development and transfer of technologies. Potential elements that may be addressed by the EGTT include technology cooperation, the regional dimension of technology transfer, work on specific technological solutions and sectoral technology agreements. He said that scaling-up of technologies for adaptation could be achieved through co-operative mechanisms, partnerships, collaborative R&D, private sector participation and strengthening institutional and organizational arrangements.

#### **1. Expert Group on Technology Transfer work programme and specific issues related to technologies for adaptation**

#### *Performance indicators*

38. The participant from Bangladesh stated that performance indicators for technologies for adaptation should take into account cultural and economic situations. He mentioned that potential performance indicators could take into account the benefits of the technologies in relation to the scale of the problem. The indicators could also focus on the number of people using the technologies and on how the technologies are addressing the exposure and resilience of the sector.

39. The participant from Sudan said that there are different barriers to mitigation and adaptation and therefore different types of performance indicators should be developed for both.

40. Other participants indicated that the purpose of indicators is not only to monitor technology transfer, but also to evaluate whether the implementation has been successful or whether it has resulted in maladaptation.



41. The user community and institutions should be closely involved in the establishment of performance indicators. The user community and institutions will benefit from the entire process of technology transfer and should therefore be involved in the process of evaluation.

#### *Information management and dissemination*

42. As mentioned in paragraph 24 above, participants agreed that access to existing climate information is needed to use planning models successfully in the development of national scenarios and to select a particular technology. In this context, participants noted the important role that the EGTT can play in the management and dissemination of information to the regions where it is most needed.

#### 2. Accelerate access to information on affordable technologies for adaptation

43. Many experts stated that access to relevant and detailed information on existing practices and technologies is crucial to selecting the proper adaptation technology and to gain an overview of the technologies for adaptation. The correct choice of region and the level of cross-border adaptation technology transfer may be necessary for the successful dissemination of the technologies.

44. Participants agreed that in order to implement adaptation activities successfully, scientists need to be integrated into the planning process and the flow of information from scientists to policymakers needs to be improved. Some experts recommended the use of specialized communication techniques to convince policymakers to use scientific data prior to making a decision. It was agreed that in order to use appropriately the information from the best available science, lessons can be learned from how such information is used in other processes.

#### 3. Scale-up international cooperation on technologies for adaptation

45. The Chair of the EGTT drew attention to the need to disseminate information on the group's activities on technologies for adaptation and to draw on relevant work from other ongoing processes. He said that many successful global communities that are actively engaged in the adaptation process are operating on a sectoral level (e.g. within the Food and Agriculture Organization of the United Nations and the World Health Organization) and the EGTT should seek out relevant information from these communities.

#### 4. Finalize the programme of work on technologies for adaptation until 2010

46. The participant from Malaysia said that the EGTT should continue to play a leading role in harmonizing the work related to the transfer of technologies for adaptation under the Convention. He suggested that the EGTT could add value by improving access to relevant information through TT:CLEAR. A database including available knowledge of and experiences with technologies for adaptation could also be established, if necessary.

47. He noted the catalytic role the EGTT could play in mobilizing action on technologies for adaptation and stressed the need to link the work on technology with the work on adaptation under the Convention, especially relating to the initiation of projects on a national basis and on a regional basis. The EGTT could also address, in its future programme of work, issues related to endogenous technologies and the promotion of joint R&D for technologies for adaptation. He stressed the need to address specific issues relating to innovative financing for such technologies.

48. The participant from Austria suggested that the EGTT should focus its work on technologies for adaptation in the most vulnerable regions and communities.

49. The participant from Canada stressed that the work of the EGTT should build on ongoing work outside and under the Convention. She recommended strengthening TNAs so that they become better

companions to NAPAs and enhancing the identification of needs for technologies for adaptation. She suggested focusing on the enabling environment, particularly on unique barriers to technologies for adaptation such as lack of communication, in order to: identify the role of the private sector in financing the adaptation process and to focus on possible market opportunities in adaptation; to analyse how adaptation technology cooperation might be different from mitigation cooperation; to identify existing cooperation partnerships in the adaptation sector; and to focus on adaptation capacity-building and information sharing.

50. The independent expert from the SEI highlighted the need for better communication and information exchange between the EGTT and the recently established Adaptation Fund Board. He said that the EGTT could provide information on selection criteria for adaptation projects that include a technology development or technology transfer component.

#### **D. Outcome and possible ways forward**

51. The Chair of the EGTT drew attention to the need to develop the Nairobi work programme theme on technologies for adaptation, bearing in mind the programme objectives as well as the EGTT work programme for 2008–2009. He emphasized the need for the EGTT to disseminate information on its activities relating to technologies for adaptation.

52. The Chair of the SBSTA, in her concluding remarks, stressed the need to maximize the contribution of the EGTT to the Nairobi work programme. She highlighted information sharing as an important means to improve collection, management, exchange, access to and use of information by Parties under the Nairobi work programme. She said that the possible output of the second phase of the Nairobi work programme, including on technologies for adaptation, will be discussed at the twenty-eighth session of the SBSTA with a view to involving more Parties in the adaptation process and to supporting sound decision making on adaptation. She concluded by emphasizing the need for coordinated joint action of existing work streams and expert groups, and the prevention of possible duplication of work.

### **IV. Issues for further consideration**

53. Participants suggested the following areas for possible further work under the Nairobi work programme, taking into consideration the deliberations during the expert meeting:

- (a) **Identifying and evaluating technologies for adaptation:** Parties have identified, in their TNAs, NCs and submissions under the Nairobi work programme, the need to identify and evaluate technologies for adaptation in the agriculture, water resources and coastal zones sectors. There might be a need to broaden the scope of such analysis to take into account regional differences and economic development;
- (b) **Distinguishing adaptation from mitigation processes:** Work on technologies for adaptation should reflect a country's sustainable development practices and their links with the MDGs. In this context, further work should focus on specific aspects of developing and transferring technologies for adaptation as opposed to technologies for mitigation;
- (c) **Strengthening TNAs:** Harmonizing and consolidating the findings of TNAs on technologies for adaptation with national development plans and NCs, and coordinating the implementation of TNAs and NAPAs;

- (d) **Enhancing enabling environments:** Establishing the necessary enabling environments by removing unique barriers to technologies for adaptation and facilitating the sharing of information by local communities;
- (e) **Financing technologies for adaptation:** Identifying the role of the private sector in financing technologies for adaptation, focusing on possible market opportunities in the adaptation process;
- (f) **Building institutional capacity:** Building capacity for developing and using technologies for adaptation and for identifying the needs of different stakeholders, in particular the public authorities in local communities;
- (g) **Improving access to information and/or data:** Better managing information flows, and enhancing the availability of, access to and dissemination of information to support technologies for adaptation;
- (h) **Avoiding maladaptation:** Informing planners about risks during the design phase. The level of information available can help to highlight potential negative impacts;
- (i) **Learning from other processes:** Identifying the existing partnerships relevant to technologies for adaptation and focusing more on information sharing. Consideration should be given to establishing a dialogue with other communities and organizations in the context of the adaptation process and technology transfer, in order to learn from their experiences.

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