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Item 3 of the provisional agenda
Nairobi work programme on impacts, vulnerability and adaptation to climate change

**Summary of the results of the implementation of the Nairobi work
programme on impacts, vulnerability and adaptation to climate
change for the period up to the twenty-eighth session of the
Subsidiary Body for Scientific and Technological Advice**

Note by the secretariat

Summary

This summary report provides an overview of the outcomes of activities under the Nairobi work programme on impacts, vulnerability and adaptation to climate change completed up to the conclusion of the twenty-eighth session of the Subsidiary Body for Scientific and Technological Advice. The report elaborates on the approach taken to implement the work programme and contains information on the outcomes of completed activities undertaken in each of the nine areas of work, on how organizations, institutions, experts, communities and the private sector are engaged in the implementation of the work programme and on how the deliverables of completed activities have been disseminated. The report concludes with issues for further consideration, including those that could be forwarded to the Subsidiary Body for Implementation for its consideration.

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I. Introduction

A. Mandate

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-fifth session, requested the secretariat to prepare a summary report consolidating the results of the implementation of the Nairobi work programme on impacts, vulnerability and adaptation to climate change for the period up to its twenty-eighth session, to be made available to Parties and relevant organizations by its twenty-ninth session.¹
2. The SBSTA requested that the summary report contain, inter alia:
 - (a) An analysis of the issues addressed by each activity, including current status and lessons learned;
 - (b) A summary of identified gaps, needs (including any capacity needs), opportunities (including possible synergy among activities), barriers and constraints;
 - (c) A summary of recommendations.²
3. The SBSTA at its twenty-eighth session agreed to provide at its twenty-ninth session relevant information and advice on the scientific, technical and socio-economic aspects of impacts, vulnerability and adaptation to climate change arising from the implementation of the Nairobi work programme for consideration by the Subsidiary Body for Implementation (SBI), following consideration by the SBSTA of the summary report mentioned in paragraph 1 above.³

B. Possible action by the Subsidiary Body for Scientific and Technological Advice

4. In line with its conclusions from its twenty-fifth and twenty-eighth sessions, the SBSTA may wish to consider this summary report, prepared by the secretariat under the guidance of the Chair of the SBSTA, at its twenty-ninth session. Subsequently it may wish to agree, inter alia, on relevant information and advice on the scientific, technical and socio-economic aspects of impacts, vulnerability and adaptation to climate change arising from the implementation of the Nairobi work programme to be provided to the SBI for its consideration.

C. Background

5. Following consideration of the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and the acknowledgement that adaptation is a necessity for all countries, Parties in 2003 agreed to initiate work on the scientific, technical and socio-economic aspects of adaptation to climate change (decision 10/CP.9). In 2004, at the tenth session of the Conference of the Parties (COP), Parties decided to elaborate a five-year work programme under the SBSTA (decision 1/CP.10). After additional deliberations at COP 11, Parties adopted the five-year programme of work of the SBSTA on impacts, vulnerability and adaptation to climate change and specified its objective, expected outcomes and scope of work (decision 2/CP.11).
6. The overall objective of the five-year programme of work 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

¹ FCCC/SBSTA/2006/11, paragraph 23.

² FCCC/SBSTA/2006/11, paragraph 24.

³ FCCC/SBSTA/2008/6, paragraph 22.

scientific, technical and socio-economic basis, taking into account current and future climate change and variability.⁴

7. A comprehensive plan of activities⁵ up to SBSTA 28 was agreed upon at SBSTA 25 in Nairobi. The COP, at its twelfth session, decided to rename the programme as the Nairobi work programme on impacts, vulnerability and adaptation to climate change.

8. At its twenty-eighth session, the SBSTA agreed on further activities⁶ for inclusion in the Nairobi work programme up to COP 16, taking into account views of Parties on further activities, the outcome of the meeting of representatives from Parties on the outcomes of completed activities under the Nairobi work programme,⁷ the outcomes of additional activities completed by that session, information presented in the Fourth Assessment Report (AR4) of the IPCC and other new scientific information, as well as relevant activities from international and regional institutions.

9. The SBSTA, at its twenty-eighth session, also expressed its appreciation to the Governments of Australia, Canada, the Czech Republic, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland and the United States of America, and to the World Meteorological Organization (WMO), for their contributions towards the implementation of the Nairobi work programme. It also expressed its appreciation to the Governments of Egypt, Mexico, Thailand, and Trinidad and Tobago, and to the Food and Agriculture Organization of the United Nations (FAO), for contributing by hosting activities under the Nairobi work programme, as well as to the experts and representatives of relevant organizations for contributing their time and expertise.

D. Approach to implementation of activities under the Nairobi work programme on impacts, vulnerability and adaptation to climate change

10. The overall approach to the implementation of the Nairobi work programme focuses on catalysing actions on adaptation, and ensuring that the activities and deliverables target stakeholders at all levels and across all sectors.

11. The implementation of the Nairobi work programme included three components:

- (a) **Undertaking specific activities mandated by the SBSTA.** These activities included the sharing of information and experience through submissions from Parties and relevant organizations, technical and synthesis reports and web-based information resources. Activities also included workshops and expert meetings, where the current status and lessons learned in the various areas of work were discussed, and recommendations were made on how to address identified gaps, needs, opportunities and constraints⁸ (see chapter II);
- (b) **Catalysing new and innovative adaptation action in support of the Nairobi work programme.** Such actions have been catalysed through engaging a wide range of organizations in Nairobi work programme activities, through the nomination of special focal points, dedicated meetings with involved organizations and small technical preparatory meetings for each area of work. Organizations and the wider adaptation

⁴ Decision 2/CP.11, annex, paragraph 1.

⁵ FCCC/SBSTA/2006/11, paragraphs 13–71.

⁶ FCCC/SBSTA/2008/6, paragraphs 10–74.

⁷ The meeting was held in Bangkok, Thailand, from 7 to 9 April 2008 and the report is contained in document FCCC/SBSTA/2008/5.

⁸ All recommendations are contained in the reports of the expert meetings and workshops undertaken under the Nairobi work programme.

community were also encouraged to undertake their own activities towards the objective and expected outcomes of the Nairobi work programme (see chapter III);

- (c) **Disseminating deliverables of the Nairobi work programme.** This includes the wide dissemination of Nairobi work programme deliverables to all relevant stakeholders through brochures, electronic newsletters, and online databases and interfaces (see chapter IV).

II. Outcomes of completed activities under the Nairobi work programme on impacts, vulnerability and adaptation to climate change

12. Up to the conclusion of SBSTA 28, activities had been undertaken under all nine areas of work, each of which covers a specific aspect of adaptation to climate change. This chapter contains an overview of the outcomes for each area of work, including a summary of the current status and lessons learned as well as of gaps and needs identified. Where a workshop or expert meeting has been held, a summary of the recommendations is provided. The overview is not meant to be exhaustive; more comprehensive information can be found in the specific documents for each area of work, such as in the reports on the expert meetings and workshops, including the full set of identified recommendations.⁹

13. Parties, including through their representatives, national experts and financial contributions, have contributed to the outcomes described below. Twenty-three Parties, including those acting on behalf of the Alliance of Small Island States and the European Community and its member States, shared their knowledge and views through submissions under the areas of work, and 114 representatives and experts from Parties not included in Annex I to the Convention (non-Annex I Parties) and 48 from Parties included in Annex I to the Convention (Annex I Parties) participated in technical workshops and expert meetings.¹⁰ The contribution of organizations, institutions, communities and the private sector is elaborated in chapter III.

A. Methods and tools

14. Activities in the area of methods and tools were undertaken with a view to developing and disseminating methodologies and tools for impact and vulnerability assessments and adaptation planning, measures and actions. Activities included submissions by Parties¹¹ and relevant organizations,¹² a synthesis report on the information and views contained in the submissions, and the relevant outputs from the work of the Least Developed Countries Expert Group (LEG), the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE) and the Expert Group on Technology Transfer (EGTT),¹³ as well as an expert meeting held in collaboration with WMO in Mexico City, Mexico, from 4 to 5 March 2008.¹⁴

15. In line with decision 2/CP.11, annex, paragraph 6 (c), and taking into account the information provided by Parties and organizations, the secretariat updated the UNFCCC “Compendium on methods and tools to evaluate impacts of, and vulnerability and adaptation to, climate change”.¹⁵ The compendium is a web-based resource that provides key information on available frameworks, methods and tools, and their special features. It is designed to assist Parties and other potential users in

⁹ All documents are available at <www.unfccc.int/3633.php>.

¹⁰ Participation in the in-session workshop on climate modelling, scenarios and downscaling is not included.

¹¹ FCCC/SBSTA/2007/MISC.12 and Add.1.

¹² FCCC/SBSTA/2007/MISC.13.

¹³ FCCC/SBSTA/2007/8.

¹⁴ FCCC/SBSTA/2008/3.

¹⁵ The updated compendium can be found at <www.unfccc.int/2674.php>.

selecting the most appropriate methodology for assessing impacts and vulnerability, and for preparing for adaptation to climate change.

1. Current status

16. Currently there is a multitude of methods and tools available for impact, vulnerability and adaptation assessment and for adaptation planning. These range from complete frameworks and general tools for adaptation planning to sector-specific assessment tools. Methods and tools are generally well received when they can be used to address adaptation on different temporal and spatial scales; are developed and applied in a transparent, flexible and participatory manner; take into account multiple perspectives and interests, in particular those of end users; and require little input data or specialist knowledge. Integrated assessments are viewed as a useful way to comprehensively assess social, economic and environmental impacts of climate change, accounting for the interaction between climate change and other processes.

2. Gaps and needs

17. Numerous gaps and needs remain that prevent methods and tools from being widely disseminated and applied. Gaps include lack of sufficient data, capacity, proper information and guidance on available methods and tools, including associated uncertainties and limitations.

18. Needs identified include improving capacity for local and sectoral assessments; integrated assessments at the subnational and national levels; integration of bottom-up and top-down approaches; better quantification of the costs and benefits of adaptation; and providing user-specific guidance on the application of the many available methods and tools.

3. Recommendations

19. In order to improve the application of methods and tools, it was recommended that guidance and interactive mechanisms be developed to enable users to share information on different methods and tools, including their application and usefulness for different types of task.

20. Recommendations on enhancing the dissemination of methods and tools included establishing and strengthening existing user-networks to share expertise and experiences on the application of methods and tools; and establishing mechanisms to enable the comparison of methods and tools.

21. In order to further the development of methods and tools, it was recommended that communication between users and developers be improved to allow for more demand- and stakeholder-driven methods and tools. It was also recommended that the user-friendliness of the UNFCCC Compendium referred to in paragraph 15 above be increased and that allowance be made for an interactive feedback mechanism on the applicability of the methods and tools contained in the Compendium.

B. Data and observations

22. Activities in the area of data and observations were undertaken with a view to improving collection, management, exchange, access to and use of observational data and other relevant information on current and historical climate variability and change. Activities included submissions by WMO and its member States and other relevant organizations¹⁶ and an expert meeting held in collaboration with WMO in Mexico City, Mexico, from 6 to 7 March 2008.¹⁷

¹⁶ FCCC/SBSTA/2007/MISC.23.

¹⁷ FCCC/SBSTA/2008/3.

1. Current status

23. Properly functioning climate observing systems and networks are important for monitoring the climate system and supporting adaptation. Accumulation of basic, reliable and high-quality climate data is vital to understanding past and current climate and climate variability, to supporting research and modelling, to improving projections of future climate and to developing effective adaptation strategies. There is a general understanding that the major challenge with regard to data and observations is not necessarily establishing an observation network, but rather maintaining it on a long-term and sustained basis once external funding is terminated, and sharing the resulting data.

24. The regional workshop programme of the Global Climate Observing System has been useful in developing regional action plans aimed at improving regional observing systems; some of these action plans are in the process of being implemented. As part of its recently adopted Strategic Plan, WMO is undertaking a number of activities for improving climate data, observations, forecasts and assessments relevant for adaptation.

2. Gaps and needs

25. Identified data needs, particularly in developing countries, include support for data collection and recovery of historical data, improvement of collecting, managing and using data at the regional level, and enhanced access to global, regional and national data.

26. In terms of observations, there is a need for improving systematic observations and monitoring systems for use in understanding climate change impacts, including through expanding coverage and increasing density, and for raising awareness among policymakers of the need for strengthened national meteorological and hydrological services.

27. Human capacity for analysing and generating data also needs to be built through training and education programmes, including improving understanding of uncertainties associated with the use of data and models.

3. Recommendations

28. Exchange of and access to observational data and information can be improved through promoting partnerships between users and providers of data; improving awareness of available data and information through creating interactive forums; and providing high-level political impetus to improve exchange of and ensure free access to data.

29. In order to promote the improvement of data and observations it was recommended that an adaptation-specific national network be established and operated and that an authoritative set of data and information needs for adaptation be defined.

30. Recommendations on improving the capacity for collection, management and use of observational data included undertaking a comprehensive stocktaking of the climatic and non-climatic data holdings at the national level and, based on this assessment, developing integrated management and collection systems capable of providing the information required for adaptation.

C. Climate modelling, scenarios and downscaling

31. Activities in the area of climate modelling, scenarios and downscaling were undertaken with a view to promoting the development of, access to and use of information and data on projected climate

change. Activities included submissions by relevant organizations¹⁸ and an in-session workshop held on 7 June 2008 during SBSTA 28 in Bonn, Germany.¹⁹

1. Current status

32. The IPCC AR4 states that current climate models are based on well-established physical principles and have been demonstrated to reproduce observed features of recent and past climate changes. The IPCC AR4 further states that there is considerable confidence that Atmosphere–Ocean General Circulation Models provide credible quantitative estimates of future climate change, particularly on continental and larger scales. Confidence in these estimates is higher for some climate variables (e.g. temperature) than for others (e.g. precipitation). In addition, increasingly reliable regional climate change projections are available for many regions as a result of advances in modelling and understanding of the physical processes of the climate system. Advances have been made in downscaling methods, model resolution, the simulation of processes of importance for regional change and the expanding set of available simulations.

2. Gaps and needs

33. Gaps remain with respect to spatial and temporal resolution and uncertainties of scenarios and model outputs. These have put constraints on the development of regional/subregional climate scenarios aiming at supporting policy-relevant impact and vulnerability assessments. Capacity-building is needed to understand the context and limitations of climate model outputs given the variety of assumptions on which models are based. There is also a need for a dialogue between the climate science community and adaptation practitioners, including policymakers, with a view to determining requirements and parameters for modelling activities so that model outputs become more policy-relevant.

3. Recommendations

34. Recommendations for enhancing the development of regional and subregional climate scenarios included promoting regional centres to ensure smooth knowledge sharing and transfer, collaboration for scenario development using various models, and capacity-building at regional and national levels.

35. In order to improve availability and applicability of climate model outputs and downscaled data for policymakers at all levels, it was recommended that the provision and dissemination of climate information that is more relevant to adaptation policymakers be promoted in user-friendly formats; that efforts to quantify and reduce uncertainty within and across models be continued in order to increase accuracy of future projections; and that the representation and communication of uncertainties be improved to ensure credibility of model outputs and climate data.

D. Climate-related risks and extreme events

36. Activities in the area of climate-related risks and extreme events were undertaken with a view to promoting understanding of impacts and vulnerability, emphasizing current and future climate variability and extreme events, and implications for sustainable development. Activities included submissions from Parties²⁰ and relevant organizations,²¹ and a workshop held in Cairo, Egypt, from 18 to 20 June 2008.²²

¹⁸ FCCC/SBSTA/2007/MISC.24 and Add.1.

¹⁹ FCCC/SBSTA/2008/9.

²⁰ FCCC/SBSTA/2007/MISC.4 and Add.1–2.

²¹ FCCC/SBSTA/2007/MISC.5.

²² FCCC/SBSTA/2007/7.

1. Current status

37. Approaches, methods and tools to assess and predict climate-related risks and impacts, including those relating to extreme events, exist for areas such as agriculture, water resources, coastal zones and health, and can be of great importance in assessing and dealing with the additional risks posed by climate change. Lessons learned include taking the disaster risk reduction approach to risk assessment and prediction as it focuses on the prediction and reduction of impacts.

38. Climate-related risk management is advanced in some countries, but many developed and developing countries are still at a preliminary stage. Management measures can include early warning systems, which are essential for reducing adverse impacts, and risk-sharing mechanisms such as insurance. Traditional knowledge can complement other scientific sources of knowledge. Greater integration and use of such knowledge is needed in the assessment and management of climate-related risks, particularly through partnerships with grass-roots organizations.

2. Gaps and needs

39. Gaps remain relating to the assessment, prediction and management of climate-related risks and impacts, including uncertainties in the prediction of climate variability and extreme events and a lack of response systems for identified risks. Needs identified include better integration of disaster risk reduction and adaptation to climate change into national sustainable development policies and plans, and better methods and tools to predict, manage and reduce impacts. Another gap is the limited availability and accessibility of risk-sharing mechanisms, such as insurance, in the most vulnerable countries.

3. Recommendations

40. In order to address gaps and needs, the adoption of a cross-cutting and interdisciplinary approach to reducing climate-related risks, in which stakeholders are actively engaged, was recommended. Recommendations for enhancing the assessment and prediction of climate-related risks and impacts included better provision of data at the national, regional and global levels, and continuous access for users to relevant data archives and databases.

41. In order to improve the management of climate-related risks it was recommended that national and sectoral planners identify and build on existing initiatives to improve communication of, and capacity-building relating to, climate-related risks; and that research institutes at the national, regional and global levels undertake research on the role of risk management mechanisms, including insurance.

42. For integrating considerations of climate-related risks and extreme events into national policies and sustainable development planning, it was recommended that national focal points for climate change and disaster risk reduction share information on the use and availability of data and information and tools for reducing hazards, risks and vulnerability across all sectors. In addition, it was recommended that national climate change and planning teams within sectoral ministries engage all appropriate sectoral and disaster risk reduction stakeholders.

E. Socio-economic information

43. Activities in the area of socio-economic information were undertaken with a view to improving knowledge of the socio-economic aspects of climate change and promoting the integration of socio-economic information into impact and vulnerability assessments. Activities included submissions from

Parties²³ and relevant organizations²⁴ and an expert meeting held in Port of Spain, Trinidad and Tobago, from 10 to 12 March 2008.²⁵

1. Current status

44. Socio-economic information is an integral part of assessing impacts and vulnerability to climate change, and of adaptation planning. Socio-economic information can highlight the different exposures to climate threats and adaptive capacities of regions, countries and communities. To date, many of the socio-economic scenarios used in impact and vulnerability assessments have adopted the storylines and scenarios developed by the IPCC *Special Report on Emissions Scenarios*²⁶ as a basis for developing quantitative scenarios at national and subnational levels.

2. Gaps and needs

45. Socio-economic information lags behind biophysical and meteorological information in terms of quality, availability and accessibility. A major gap is the lack of spatially differentiated socio-economic information, especially at the subnational scale. Even when socio-economic information is available, its applicability for adaptation planning is limited. Data are often collected in inconsistent formats, disseminated on aggregate scales, dispersed in terms of their location, and not available in formats usable for vulnerability and impact assessments and adaptation planning. Further efforts are needed to improve the integration of qualitative socio-economic information into assessments.

3. Recommendations

46. Recommendations for improving information on socio-economic aspects of climate change included prioritizing data needs, standardizing data collection and storage, geo-referencing existing data, facilitating the generation of data specific to adaptation purposes and offering incentives to data providers to make their data widely accessible.

47. Recommendations for integrating socio-economic information into impact and vulnerability assessments included developing an open dialogue between providers and users of information in order to tailor information to specific data needs, developing guidance on the use of existing data and packaging the information so that it is of relevance to the decision-making processes, and developing information on costs and benefits of adaptation options.

F. Adaptation planning and practices

48. Activities in the area of adaptation planning and practices were undertaken with a view to collecting, analysing and disseminating information on past and current practical adaptation actions and measures, including projects, short- and long-term strategies, and local and indigenous knowledge.

49. Activities included submissions by Parties²⁷ and relevant organizations;²⁸ a synthesis report based on the information contained in the submissions;²⁹ a synthesis report on the outputs of the work of the LEG, the CGE and the EGTT, relevant to adaptation planning and practices;³⁰ and a workshop held in

²³ FCCC/SBSTA/2007/MISC.21 and Add.1.

²⁴ FCCC/SBSTA/2007/MISC.22.

²⁵ FCCC/SBSTA/2008/2.

²⁶ <www.ipcc.ch/ipccreports/sres/emission/index.htm>.

²⁷ FCCC/SBSTA/2007/MISC.10 and Add.1.

²⁸ FCCC/SBSTA/2007/MISC.11.

²⁹ FCCC/SBSTA/2007/9.

³⁰ FCCC/SBSTA/2007/10.

collaboration with FAO in Rome, Italy, from 10 to 12 September 2007.³¹ In addition, the secretariat prepared a web-based interface providing information on existing adaptation practices and local coping strategies for adaptation, building upon the secretariat's database on local coping strategies.³²

1. Current status

50. The status of adaptation planning and practices varies across sectors such as agriculture and food security, water resources, coastal zones and health, and across different levels, including the subnational, national, regional and international levels. Lessons learned include using current exposure to natural hazards and climate variability as an entry point for adaptation; using case studies and guidelines to engage stakeholders; and the importance of understanding, valuating and incorporating indigenous and local knowledge and technologies.

2. Gaps and needs

51. Despite some advances many gaps and needs remain. For example, there is a gap between adaptation assessment and planning, on the one hand, and implementation on the other. This is owing to a number of constraints including lack of capacity, data, information and resources. Uncoordinated sectoral responses can be ineffective or even counterproductive because responses in one sector can increase the vulnerability of another sector and/or reduce the effectiveness of adaptation responses taken in that sector. Hence there is a need to adopt a cross-sectoral approach to adaptation as part of an overall sustainable development strategy.

3. Recommendations

52. In order to promote adaptation planning and practices at all levels and across all sectors, it was recommended that a conceptual framework for adaptation be developed that would assist in identifying the range of available adaptation options while at the same time providing for flexibility and redesign of options as more clarity emerges regarding the level of change or impacts to which different sectors and levels need to adapt.

53. Other recommendations included enhancing the integration of adaptation into development and budgetary planning and policies across all sectors and at all levels, and enhancing the engagement of the private sector by promoting a business charter on adaptation, in which the private sector highlights good practices in integrating adaptation into their operations.

54. To further improve understanding of adaptation practices, it was recommended that more targeted research be undertaken aimed at identifying and assessing practical adaptation options, including their costs, benefits and possible trade-offs, and that the results of a stocktaking of adaptation databases be shared with a view to raising awareness of sources of shared knowledge and to validating good practices.

G. Research

55. Activities in the area of research were undertaken with a view to promoting research on adaptation options. Activities included a synthesis report on ongoing and planned adaptation research and associated needs.³³

56. In addition, at SBSTA 26, Parties agreed to develop and maintain a dialogue between Parties and international and regional climate change research programmes and organizations on research in the

³¹ FCCC/SBSTA/2007/15.

³² The web-based interface is available at <www.unfccc.int/4363.php>.

³³ FCCC/SBSTA/2007/12.

context of decision 9/CP.11. They invited relevant research programmes and organizations to regularly inform the SBSTA of developments in research activities relevant to the needs of the Convention, including emerging scientific findings and activities undertaken in response to key uncertainties and research needs identified by the IPCC or raised by Parties.³⁴

57. As part of this dialogue, an informal meeting was held during SBSTA 28, during which representatives from research programmes and organizations and the IPCC provided information on their activities responding to the issues identified at SBSTA 26.³⁵ As agreed at SBSTA 28, further in-depth consideration should be given to those issues at future dialogue meetings. Furthermore, the SBSTA emphasized the need to enhance research activities aimed at supporting adaptation efforts.

1. Current status

58. The IPCC AR4, and in particular the contribution of its Working Group II, provides a comprehensive assessment of impacts, vulnerability and adaptation and a rationale to do more research in order to address the identified gaps and needs. Additional recent studies further improve understanding of impacts, vulnerability, current adaptation options and practices, and of barriers and constraints. Adaptation research is undertaken at the international level by research programmes and organizations such as the World Climate Research Programme, the International Geosphere–Biosphere Programme and the International Human Dimensions Programme on Global Environmental Change, and at the regional, national and local/community levels throughout the world, including by regional organizations and networks.

2. Gaps and needs

59. Many gaps and needs were identified in the synthesis report and during the dialogue referred to in paragraphs 55 and 57 above. Needs identified regarding understanding impacts and vulnerabilities include reducing uncertainty in the sensitivity of the climate system, enhancing the connections between General Circulation Models and regional models to improve the performance of regional climate change models, and enhancing the validation of climate models with observations of essential climate variables.

60. In terms of facilitating adaptation planning and implementation, research needs include understanding and reducing economic, technical, social and institutional barriers to adaptation as well as better understanding various adaptation options, including through identifying costs, benefits and potential trade-offs. Efforts also need to be made to develop adaptation scenarios for different greenhouse gas stabilization levels and assumptions.

3. Recommendations

61. During the dialogue it was recommended that human, financial, technical and institutional resources as well as cross-regional cooperation be increased, in particular in developing country Parties, in order to enhance adaptation research. To enhance utilization of research it was recommended that research results be mainstreamed into policy processes, for example through science–policy dialogues such as those taking place during the SBSTA sessions.

H. Technologies for adaptation

62. Activities in the area of technologies for adaptation were undertaken with a view to promoting the development and diffusion of technologies, know-how, and practices for adaptation. Activities

³⁴ See document FCCC/SBSTA/2007/4, paragraph 47 (a–f) for the list of issues identified at SBSTA 26.

³⁵ Presentations made and a Chair's summary of the informal meeting are available at <www.unfccc.int/4422.php>.

included submissions by Parties³⁶ and relevant organizations³⁷ as part of their submissions on adaptation planning and practices, and a synthesis report based on the information contained in the submissions.³⁸ In addition, the COP at its thirteenth session requested the secretariat to organize, as an input to the Nairobi work programme, 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 (NAPAs).³⁹ The joint expert meeting took place on 5 April 2008 in Bangkok, Thailand.⁴⁰

63. The EGTT has undertaken much work on technologies for adaptation, including a seminar in 2005 on the development and transfer of environmentally sound technologies for adaptation to climate change,⁴¹ a technical paper⁴² and a brochure on the application of technologies for adaptation. The technical paper contains a framework for assessing technologies for adaptation to climate change, an overview on the process of technology development and transfer as relevant to adaptation, and examples of important technologies for adaptation in five sectors – coastal zones, water resources, agriculture, public health and infrastructure.

1. Current status

64. Technologies have an important role to play in any effective adaptation action. For example, sustainable urban drainage systems reduce flood risks; cyclone shelters, protective structures and early warning systems reduce the vulnerability of communities living in coastal zones; and water-use management systems are important steps in promoting collaboration on adaptation in the agricultural sector and reducing the risks of droughts.

65. Technologies for adaptation most commonly reported in the submissions mentioned in paragraph 62 above were in the agriculture and fisheries sector, followed by those in the water resources, coastal zones, biodiversity, health and infrastructure sectors and by cross-cutting technologies. Technologies for adaptation include hard technologies, such as drought-resistant crop varieties, seawalls and irrigation technologies, or soft technologies, such as crop rotation patterns. Many technologies have both hard and soft characteristics, and successful adaptation action would typically combine the two. Traditional technologies and know-how are key to technologies for adaptation; they already exist, they are suitable for many developing countries and they can potentially be improved by local communities.

2. Gaps and needs

66. Many gaps and needs remain which constrain the widespread application of technologies for adaptation. Needs include building adequate human, technical and institutional capacity to diffuse and employ technologies; improving information and awareness-raising among all stakeholders, including communities; and providing sufficient financial resources.

3. Recommendations

67. Recommendations relating to advancing technologies for adaptation include identifying and evaluating technologies for adaptation appropriate for different sectors, regions and stages of economic development; strengthening technology needs assessments through integrating their results into national

³⁶ FCCC/SBSTA/2007/MISC.10 and Add.1.

³⁷ FCCC/SBSTA/2007/MISC.11.

³⁸ FCCC/SBSTA/2007/6.

³⁹ FCCC/CP/2007/6, paragraph 79 (b).

⁴⁰ FCCC/SBSTA/2008/4.

⁴¹ FCCC/SBSTA/2005/8.

⁴² FCCC/TP/2006/2.

and sectoral development and adaptation plans, including NAPAs; and enhancing financial and institutional support, information-sharing, capacity-building and enabling environments.

68. In addition, it was suggested that the EGTT pay particular attention to technologies for adaptation when implementing its programme of work for 2008–2009.

I. Economic diversification

69. Activities in the area of economic diversification were undertaken with a view to promoting the understanding and development of measures, methodologies and tools aimed at increasing economic resilience of, and reducing reliance on, vulnerable economic sectors, especially in developing countries. Activities included submissions by Parties⁴³ and relevant organizations,⁴⁴ and a synthesis report based on the information contained in the submissions.⁴⁵

1. Current status

70. Economic diversification takes place at various levels and in different sectors. At the national level, economic diversification entails reducing overdependence on a narrow economic base. At the sectoral level, economic diversification entails adapting existing practices to reduce exposure to risk. At the community level, livelihood diversification has been a long-standing strategy to cope with external shocks including those that are climate-related. Understanding how such shocks have evolved and what lessons and good practices can be derived is important in moving forward the economic diversification discourse. In ascertaining the potential benefits of economic diversification an assessment is needed, on a case-by-case basis, of whether it contributes to alleviating vulnerability to climate change.

2. Gaps and needs

71. Gaps and needs identified in the submissions mentioned in paragraph 69 above include the need for improved tools for modelling and assessment of vulnerability to climate change impacts in the context of economic diversification. There is a lack of models that link predictions of physical impacts to input–output models in order to assess sectoral vulnerability, although these are necessary for effective economic diversification. Public participation is also needed in all the processes that increase resilience of, and decrease reliance on, vulnerable sectors; in this regard the private sector plays a key role. Concerns were also expressed over the difficulty of undertaking economic diversification, particularly in countries where national circumstances make alternative economic activities difficult.

III. Engagement of organizations, institutions, experts, communities and the private sector in the activities of the Nairobi work programme on impacts, vulnerability and adaptation to climate change

72. The successful implementation and achievement of the objective of the Nairobi work programme depend to a large degree on involving organizations and stakeholders active in adaptation at all levels and in all sectors. The SBSTA thus requested the secretariat to strive to engage a wide range of organizations, institutions, experts and communities in the implementation of the Nairobi work programme. To this end, the SBSTA invited relevant organizations and other stakeholders to participate in the implementation of activities under the Nairobi work programme, and urged them to undertake their own activities in support of the objective and themes identified in decision 2/CP.11 and to share the outcomes of these activities with the SBSTA at subsequent sessions, as appropriate.⁴⁶

⁴³ FCCC/SBSTA/2007/MISC.15 and Add.1.

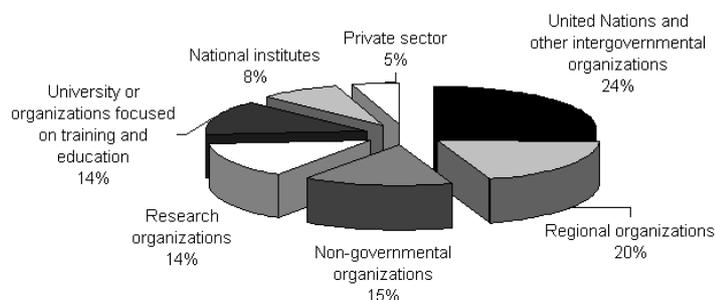
⁴⁴ FCCC/SBSTA/2007/MISC.16.

⁴⁵ FCCC/SBSTA/2007/14.

⁴⁶ FCCC/SBSTA/2006/11, paragraph 17.

73. A number of organizations, institutions, experts and communities and the private sector have actively participated in the implementation of mandated activities under the Nairobi work programme. Twenty-five organizations and institutions shared their knowledge and views through submissions, and representatives from 87 organizations participated in workshops and expert meetings (see the figure below for an overview of the types of organizations represented).

Types of organizations that have participated in workshops and expert meetings



74. The secretariat organized small technical preparatory meetings with representatives from specialized organizations and institutions to discuss the areas of work. These meetings contributed to the organization of the workshops and expert meetings as well as to the further engagement of organizations, institutions and experts in the implementation of the Nairobi work programme.

75. Expert input⁴⁷ to the mandated activities was provided through, inter alia, expert groups under the Convention, namely the LEG, the CGE and the EGTT. The LEG provided advice to least developed country (LDC) Parties on strategies and technical aspects of preparing and implementing NAPAs. The Chair of the LEG expressed the group's readiness to support non-LDCs in developing adaptation plans. The CGE provided technical advice and support through hands-on training and examination of national communications from non-Annex I Parties in the area of tools, methodologies and processes for vulnerability and adaptation assessments. The EGTT contributed by providing technical advice and guidance on technologies for adaptation in order to improve understanding of, and identify prioritized needs for, these technologies. It also sought to improve the process of technology development and transfer as relevant to adaptation.

76. In addition to using the broad expertise provided by experts and representatives from Parties, organizations and the expert groups, the secretariat has sought the active engagement of individual experts to provide specific knowledge and experience to the different areas of work through contributing to background papers and notes, guiding discussions as facilitators and making technical presentations. A total of 57 individual experts, 31 from non-Annex I Parties and 26 from Annex I Parties, were invited to attend and support expert meetings and workshops and an additional eight experts were funded by Parties to assist in this undertaking.

77. In an effort to engage a wider range of expertise in the implementation of the Nairobi work programme, the SBSTA also invited Parties to update the UNFCCC roster of experts⁴⁸ to ensure that all areas of expertise relevant to impacts, vulnerability and adaptation are represented in the roster. Up to SBSTA 28, the roster included a total of 228 experts in vulnerability assessment, climate change impacts and adaptation. Experts were nominated by 61 non-Annex I Parties and 29 Annex I Parties.

⁴⁷ See document FCCC/SBSTA/2008/10 for more information on lessons learned in involving experts in the implementation of the Nairobi work programme.

⁴⁸ <www.unfccc.int/534.php>.

78. By the conclusion of SBSTA 28, 109 organizations and institutions worldwide had offered to contribute to the objective of the Nairobi work programme and had nominated a focal point with whom the secretariat can liaise.⁴⁹

79. Some organizations, including FAO, IPCC, the Interagency Secretariat of the United Nations International Strategy for Disaster Reduction, the Organisation for Economic Co-operation and Development, the Ibero-American Network of Climate Change Offices, the United Nations Development Programme, the World Bank, the World Health Organization and WMO, have taken the opportunity to provide information on their relevant activities, and to make proposals for their involvement in the implementation of the Nairobi work programme, whether through statements at SBSTA sessions, concept notes or, as in the case of the United Nations Environment Programme, a joint retreat with the secretariat.

80. At their first forum of focal points of engaged organizations and institutions, held in Bali on 10 December 2007, 42 focal points discussed with the secretariat the current state and future evolution of the Nairobi work programme. Following a stocktaking of activities under the Nairobi work programme many organizations moved to pledge action in relevant areas of the work programme in order to facilitate achieving the objective of the Nairobi work programme.⁵⁰

81. Organizations have also been increasingly committing themselves to undertake their own activities towards the objective and expected outcomes of the Nairobi work programme under specific areas of work, as reflected in submissions, statements, concept notes and Action Pledges.

82. By the conclusion of SBSTA 28, 34 Action Pledges from 15 organizations had been received.⁵¹ Pledged activities span all nine areas of work and include developing and disseminating tools to evaluate and reduce agricultural risks, piloting projects on the uses of plant genetic resources, and educating and training the next generation of vulnerability and adaptation researchers and practitioners.

83. In addition, the secretariat, under the guidance of the Chair of the SBSTA and in consultation with Parties, prepared Calls for Action⁵² aimed at facilitating the implementation by a wide range of stakeholders of recommendations resulting from workshops and expert meetings under the Nairobi work programme. The Calls for Action are intended to communicate in a user-friendly format the identified practical actions to all relevant stakeholders in order to stimulate a response, including in the form of the above-mentioned Action Pledges. At the meeting of representatives from Parties on the outcomes of completed activities under the Nairobi work programme referred to in paragraph 8 above, Parties encouraged those organizations active in supporting Parties, either through making Action Pledges or responding to Calls for Action, to periodically inform the SBSTA of the results achieved.

84. At the beginning of 2008, the secretariat began to further its engagement with the private sector in line with decision 2/CP.11, and developed an initiative to enhance relations with businesses. As a first stage the secretariat is developing a central information resource that can inform businesses, governments and other stakeholders of the work relating to adaptation being carried out by the private sector. To this end, the secretariat is contacting businesses and requesting them to register their interest in being linked to the Nairobi work programme and to provide information on the work that they are doing on adaptation via a dedicated website⁵³ and a questionnaire.

⁴⁹ An overview of engaged organization, institutions, experts and communities is available at <www.unfccc.int/3964.php>.

⁵⁰ http://unfccc.int/files/adaptation/sbsta_agenda_item_adaptation/application/pdf/nwp_forum_summary_web.pdf.

⁵¹ <www.unfccc.int/3996.php>.

⁵² By the conclusion of SBSTA 28, six Calls for Action had been developed. These Calls for Action and further information on related ongoing work are available at <www.unfccc.int/4430.php>.

⁵³ <www.unfccc.int/4291.php>.

IV. Dissemination of deliverables of completed activities under the Nairobi work programme on impacts, vulnerability and adaptation to climate change

85. The SBSTA agreed that the deliverables resulting from the implementation of the Nairobi work programme should be widely disseminated to relevant stakeholders through effective means, including by the secretariat.⁵⁴

86. The secretariat has used different means to disseminate the deliverables and outcomes of the Nairobi work programme to different stakeholders. Based on submissions from Parties and organizations, information on the current status of the areas of work, including lessons learned, gaps and needs, has been disseminated through miscellaneous documents, synthesis reports and an online database in the field of adaptation practices. In addition, recommendations on how to address the gaps and needs are contained in workshop and meeting reports and in the Calls for Action.

87. To reach a wide range of stakeholders, the secretariat developed brochures that introduced the work programme and provided information on progress in its implementation. Some 4000 brochures were disseminated at SBSTA 26 and SBSTA 27 and in conjunction with meetings under the Nairobi work programme and related adaptation events. The secretariat also developed an electronic newsletter to update engaged organizations on progress in the implementation of the Nairobi work programme.⁵⁵ In addition, most of the workshops and expert meetings held under the Nairobi work programme were covered by the *Earth Negotiations Bulletin* – the reporting service of the International Institute for Sustainable Development – to ensure a wide dissemination of discussions and results.

88. Organizations have also used their own means to disseminate the outcomes of activities undertaken in support of the Nairobi work programme. For example, WMO and FAO provided concept papers at SBSTA sessions and the secretariat of the Global Change SysTEM for Analysis, Research, and Training (START) produced a brochure⁵⁶ highlighting its work.

V. Issues for further consideration

89. The results of the activities completed up to the conclusion of SBSTA 28 constitute an effective initial contribution to achieving the objective of the Nairobi work programme as laid out in decision 2/CP.11. In order to enhance the achievement of the objective and expected outcomes Parties at SBSTA 28 adopted a comprehensive set of further activities⁵⁷ that reflect many recommendations made during the first phase of the work programme.

90. Parties at SBSTA 28 also agreed to promote the implementation of recommendations and Calls for Action from the first phase of the Nairobi work programme by a broad range of stakeholders, including organizations, institutions, experts, communities and the private sector, with a view to undertaking activities at international, regional, national and subnational levels.

91. As for recommendations dealing with implementation-related aspects that could be addressed within the UNFCCC process, Parties may wish to consider forwarding these to the SBI for its

⁵⁴ FCCC/SBSTA/2006/11, paragraph 26.

⁵⁵ The brochures and newsletters are available at <www.unfccc.int/3633.php>.

⁵⁶ <www.start.org/Publications/other/START-NWP%20Booklet_2007_Final.pdf>.

⁵⁷ FCCC/SBSTA/2008/6, paragraphs 10–74.

consideration under relevant agenda items, as appropriate. Issues identified in expert meetings and workshops include:

- (a) Enhancing capacity-building and support to developing countries for enhancing work in the areas of impacts and vulnerability and adaptation planning, measures and actions;⁵⁸
- (b) Expanding the NAPA process undertaken by LDCs for use by any developing country Party that wishes to develop national adaptation programmes or strategies;⁵⁹
- (c) Enhancing the integration of adaptation into development and budgetary planning and policies across all sectors and at all levels;⁶⁰
- (d) Promoting the creation of enabling environments, including legislative frameworks, with a view to facilitating adaptation planning and policies;⁶¹
- (e) Supporting national adaptation platforms to facilitate the development of integrative adaptation strategies and plans.⁶²

⁵⁸ FCCC/SBSTA/2007/15, paragraphs 76 (c) and 81 (b); FCCC/SBSTA/2008/2, paragraphs 63 (c) and 64 (b) and (g); FCCC/SBSTA/2008/3, paragraph 69 (b); FCCC/SBSTA/2008/9, paragraphs 42 (e) and (f) and 43 (f).

⁵⁹ FCCC/SBSTA/2007/15, paragraph 80 (c).

⁶⁰ FCCC/SBSTA/2007/15, paragraph 73 (g).

⁶¹ FCCC/SBSTA/2007/15, paragraphs 76 (d) and 78 (b).

⁶² FCCC/SBSTA/2007/15, paragraph 78 (a).