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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
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Item 5 of the provisional agenda
Research and systematic observation

Research needs and priorities relating to the Convention

Submissions from Parties

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-second session, welcomed efforts of the national, regional and international global change research programmes to further promote and coordinate research in response to the needs of the Convention, and invited them to provide periodic updates on their scientific activities (FCCC/SBSTA/2005/4, para. 75).

2. The SBSTA invited Parties to submit to the secretariat, by 15 January 2006, information on identified research needs and priorities relating to the Convention, including information relating to the enhancement of the capacity of developing countries to contribute to and participate in climate change research (FCCC/SBSTA/2005/4, para. 77).

3. The secretariat has received five such submissions. In accordance with the procedure for miscellaneous documents, these submissions are attached and reproduced[*] in the language in which they were received and without formal editing.

[*] These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

[**] Reissued for technical reasons.

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* This submission is supported by Bulgaria and Romania.

PAPER NO. 1: JAPAN

Identified Research Needs and Priorities Relating to the Convention, Including Information Relating to the Enhancement of the Capacity of Developing Countries to Contribute to and Participate in Climate Change Research

Submission by the Government of Japan

Japan welcomes the opportunity to submit its information on identified research needs and priorities relating to the Convention, including information relating to the enhancement of the capacity of developing countries to contribute to and participate in climate change research, invited by the Subsidiary Body of Scientific and Technical Advice (SBSTA) at its 22nd Session in May 2005(FCCC/SBSTA/2005/L.17).

Japan believes that it is valuable to share and exchange information on identified research needs and priorities among Parties and also with the scientific community so that limited resources are best utilized for research that directly meets the needs of policy makers, while answering properly to the needs identified by the research community.

Japan had provided its views on research needs and priorities relevant to the Convention by taking advantage of the previous submission opportunities (the views of Japan are contained in document FCCC/SBSTA/2004/MISC.14 and FCCC/SBSTA/2002/INF.17). Therefore, in this submission, Japan would like to put a focus on recently identified research needs and priorities.

1. Previously Identified Research Needs and Priorities to be Paid Continuous Attention

Japan has been promoting research in order to address the issues pointed out by the Third Assessment Report (TAR), and research outcomes with significant potential to contribute to the Fourth Assessment Report (AR4) of the IPCC have already emerged. From these experiences, as stated in our submissions above, Japan considers that further development of modeling and process studies is important.

Therefore, Japan would like to again emphasize the following subjects as priorities for the scientific community in their research and assessments.

(i) Improve understanding of the mechanisms and factors leading to changes in radiative forcing.

(ii) Understand and characterize the important unresolved processes and feedbacks, both physical and biogeochemical, in the climate system.

(iii) Improve methods to quantify uncertainties of climate projections and scenarios, including long-term ensemble simulations using complex models.

(iv) Improve the integrated hierarchy of global and regional climate models with a focus on the simulation of climate variability, regional climate changes and extreme events.

(v) Link more effectively models of the physical climate and the biogeochemical system, and in turn improve coupling with descriptions of human activities.

Japan also would like to emphasize that comprehensive, coordinated and sustained Earth observation needs to be further developed since it is closely related to modeling and process studies in terms of validation and analysis.

2. Emerging Research Needs and Priorities

(i) Climate Modeling with Special Focus on the Behavior of Extreme Events in the Near Future

We have seen an apparent increase in certain extreme events in recent years: the 2002 summer floods and 2003 summer heat waves in Europe; a large number of typhoons crossing Japan in 2004; and very strong hurricanes devastating Caribbean islands and Louisiana in the U.S.A. in 2005 - to cite but a few examples.

Japan considers that one of the current research needs is to respond to issues related to such extreme events, and to question whether climate change is related to increases in the frequency and intensity of extreme events. This includes the issue of whether global warming is already affecting us through amplified variability of the climate system.

Japan therefore assigns high priority to the development of climate models for further reliable projection of climate change in the 21st century - with a special focus on the behavior (frequency and intensity) of extreme events (heat waves, cold snaps, tropical cyclones, storm surges, severe storms, droughts, etc.) in the near future (circa 25 years hence). Japan also considers it important that such modeling should be made in detail at a regional level so that projection outcomes can be adequately applied to impact or adaptation studies.

(ii) Projection of Long-term Climate Change under Various Scenarios

Japan considers that the scientific, technical and socio-economic findings based on long-term climate change projection under scenarios - including those related to stabilization, both updated and policy-relevant - could now play unprecedented important roles in providing a more reliable base for necessary decision-making for safeguarding of the Earth's environment. Recent, rapid progress of computer technology will enable the integration of advanced climate models over centuries or longer for an increasing number of modeling groups.

In this regard, Japan puts another priority on the long-term projection of climate change under stabilization scenarios by further promoting climate modeling in terms of various factors of the Earth's environment- such as thermohaline circulation, polar ice sheets, land surface vegetation, and the carbon cycle.

(iii) Promotion of the Data Integration and Assimilation

To promote climate change research, it is also getting increasingly important to make better use of all available data from atmospheric, land surface and oceanic observations by suitably integrating and assimilating them.

Japan has already established a re-analysis data set based upon a global atmospheric model, called the 'Japanese Re-Analysis 25 years (JRA-25) for 1979-2004' under a joint 5-year (2001-2005) project of the Japan Meteorological Agency (JMA) and the Central Research Institute of Electric Power Industry (CRIEPI). The JRA-25 system has transitioned into the JMA operational Climate Data Assimilation System (JCDAS). Following JRA-25, a second re-analysis project (which spans over 50 years of data) is planned by JMA.

In an ongoing *Kyo-sei* Project (FY2002-FY2006) under the Ministry of Education, Culture, Sports, Science and Technology (MEXT), a sub-project is being conducted by a research group of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and other research institutions - on development of a 4-dimensional data assimilation system for a global climate (coupled atmosphere-ocean) model to construct an ocean re-analysis data set.

Japan considers that further promotion of data integration and assimilation is needed to better utilize available data, in addition to the above efforts for better climate change research.

Japan has therefore initiated the project to development the data integration and analysis system which collects, assimilates and integrates data from satellite and ocean/land observations, and distributes thus derived data in response to the user needs - such as climate change research and public decision-making. It will be established as one of the “national core technology” projects under Japan’s Science and Technology Basic Plan in its third term (FY2006-FY2010), and is also expected to contribute to the Global Earth Observation System of Systems (GEOSS).

(iv) Establishment of the Integrated Database from Climate Change Research Outcomes

To better meet the needs of the Convention, Japan believes that it is important to coordinate activities in climate change monitoring, advanced climate modeling, and impact and adaptation studies. In this regard, Japan considers it necessary to establish a database system where data obtained from systematic observation, data computed from climate change projection models, and outcomes from impact and adaptation studies are integrated so that information from different research areas can be made mutually sharable and more applicable to mitigation policies.

3. Enhancement of the Capacity of Developing Countries to Contribute to and Participate in Climate Change Research

(i)Provision of Research Results Useful for Regional Impact or Adaptation Studies

As the resolution of global climate models increases, their results become more useful for regional studies on impact or adaptation. Japan has been providing computed data from a global climate model with 20km horizontal resolution in the atmosphere to several developing countries - mostly for their regional adaptation studies. Japan has also invited researchers from developing countries under World Bank funds to help familiarize them with numerical analysis of data. Through their research output, Japan has also benefited through improvements to the model. Japan believes that such research cooperation activities could be a good example of sustainable and effective capacity building.

(ii) Promotion of Research and Capacity Development through APN

The Asia-Pacific Network for Global Change Research (APN) is an inter-governmental network whose primary purposes are to foster global environmental change research in the Asia-Pacific region, increase developing country participation in that research, and to strengthen links between the science community and policy makers. It promotes, encourages and supports research activities on long-term global changes in climate, ocean and terrestrial systems, and on related physical, biogeochemical and socio-economic processes. To date, 21 countries have joined the network.

The Asia-Pacific is an important region in development of our understanding of global environmental problems. Important atmospheric and oceanic phenomena occur here - such as the Asian Monsoon and the El Niño phenomena, which affect world climate, and the region also has extensive tropical forests, deserts, and mountains. At the same time, the Asia-Pacific region has a large and economically active population.

Thus, observation, monitoring, and research on global change in the Asia-Pacific region are indispensable to our understanding of the environmental changes taking place on a global scale. In addition, stronger links are needed between the science community and policy makers. APN was created in 1996 to answer these needs. Japan believes that it is effective and efficient to take advantage of this existing network for promotion of substantial capacity development.

PAPER NO. 2: MEXICO

Research needs relating to the Convention

Information from Parties on identified research needs and priorities relating to the Convention

Submission by Mexico

I. Mandate

The Conference of the Parties (COP) at its eleventh session (Montreal, Canada, 28 November – 9 December 2005), invited Parties and relevant international organizations to submit to the secretariat, by 15 January 2006, their views on identified research needs and priorities relating to the Convention, including information relating to the enhancement of the capacity of developing countries to contribute to and participate in climate change research[1].

Mexico welcomes this opportunity to provide views and submits the following proposals.

II. Possible Research needs relating to the Convention

Adaptation

Noting the urgent need to adapt to the adverse effects of climate change in all countries, particularly, the least developed countries and small islands developing states, Mexico considers important to take into account the following research needs relating to the Convention:

- Enhanced research on adaptation tools and methods for specific regional circumstances, especially for developing regions.
- Research on short term impacts of climate change and climate variability, specially in relation to extreme events, since their effects are already having serious negative impacts.
- Research on prevention and reduction of risk to climate change and climate variability, especially to extreme events, through the reduction of vulnerability.
- Enhancement and increment of the consideration of the human dimension on the climate change research; specifically, the impacts, vulnerability and adaptation from a human dimension perspective.

Mexico suggests to identify "Regional Adaptation Centers" from existing institutions, in order to increase regional cooperative networks and funds to adapt to climate change. Mexico reiterates the relevance of maximizing the use of existing institutions in different regions, such as the Inter-American Institute of Global Change Research (IAI) and the Asia-Pacific Network for Global Change Research (APN).

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[1] FCCC/SBSTA/2005/L.6, paragraph 4

Particularly, in the region of Latin America and the Caribbean, we have also identified the need to reinforce capacity building in climate change research in areas such as water management and extreme climate events (i.e. hurricanes and droughts).

Mitigation
In terms of mitigation, Mexico proposes the following research needs relating to the Convention:

- Research on urban planning and climate change mitigation.
- Increased research on sustainable transport (i. e. new technologies and biocombustibles).
- Studies to develop specific greenhouse gas national emissions factors.

Other research needs
- Research on soil humidity tendencies through soil humidity monitoring stations as part of the water cycle understanding.
- Research on the costs and benefits of mitigation and adaptation under various scenarios.
- Enhanced research on the integration of mitigation and adaptation in sustainable development.
- Research on the development of efficient methods and tools for climate change communication strategies, to be used for different stakeholders (policy makers at the federal, state and local level).
- Development of research projects, in the framework of the Joint Liaison Group, that involves synergies with other Conventions for adopting mitigation and adaptation actions to climate change.

We reiterate the need to develop research projects for adaptation and/or mitigation with a multidisciplinary and interdisciplinary vision, emphasizing the socioeconomic variables.

We also reiterate the importance of capacity building through international cooperation, in order to train and have specialized personnel on the issues mentioned above.

Finally and in order to have an informed point of view about on-going and planned activities of the international and intergovernmental research programmes relating to the implementation of the Convention, Mexico expresses its interest to see the synthesis report that the Secretariat will elaborate before the twenty fourth session of the SBSTA.

PAPER NO. 3: SWITZERLAND

SBSTA 24
Research needs relating to the Convention

1. In our view, the SBSTA should address under the same agenda item :
   - research needs
   - systematic observation
   - assessment of knowledge

   relating to climate change.

2. The SBSTA has to satisfy simultaneously, as appropriate, both the needs under the three items mentioned in paragraph 1 above of :
   - the Convention
   - the Kyoto Protocol

   taking advantage of synergies.

3. The role of the SBSTA should be guided by the provisions of articles 9 and 4.1 (g) of the Convention. It has to draw upon existing competent international bodies to provide to the Conference of the Parties with, *inter alia*, assessments on knowledge on climate change and should therefore neither deal with the results of individual research projects, nor conduct or manage research programmes.

4. We support working within the framework that the SBSTA 17 has already sketched on these matters with the view to regularly :
   - informing Parties on ongoing research on climate change
   - providing a forum to Parties to consider research on climate change
   - communicating research needs to the scientific community

   noting the importance of social as well as natural sciences and the need to enhance the capacity of developing countries to contribute to, and participate in research, observation and assessment efforts, on global climate.

5. In order to operationalize this framework, we propose :
   - to establish an informal joint group on these matters with relevant international bodies active on climate research, observation and assessment, namely the IPCC, the GCOS, the WMO and its WCRP, the IGBP, IHDP and DIVERSITAS. This group should meet and exchange information regularly and report to the SBSTA
   - to maintain a list of research and observations needs and programmes, and assessments of knowledge relating to the Convention and the Kyoto Protocol. To that aim, the Secretariat should collect these needs and assessments in :
     - the submissions by Parties
     - the national communications from Parties
     - side-events during the SBSTA sessions
     - workshops
     - the works of the IPCC as well as the information provided by other relevant international organisations.

   This information should be made available on the web site of the Convention.

PAPER NO. 4: UNITED KINGDOM OF GREAT BRITIAN AND NORTHERN IRELAND ON BEHALF OF THE EUROPEAN COMMUNITY AND ITS MEMBER STATES

SUBMISSION BY THE UNITED KINGDOM ON BEHALF OF THE EUROPEAN COMMUNITY AND ITS MEMBER STATES

This submission is supported by Bulgaria and Romania

London, 07 November 2005

The UK on behalf of the European Union and its member states, with Bulgaria and Romania, is pleased to submit views on priority areas of research and questions for the scientific community relevant to the Convention as requested by the SBSTA at its twenty-second session (FCCC/SBSTA/2005/4) for the further consideration by SBSTA of these issues at the twenty-fourth and subsequent sessions. The EU welcomes the opportunity to have a dialogue with representatives of the international science programmes and would be happy to see this continue as a standing item on the agenda. The EU recognises that such a dialogue should be complementary to and take into account the work of the IPCC.

International Research Priorities
The EU recalls its previous submission on research priorities in 2002 (FCCC/SBSTA/2002/MISC.15) and notes that many of the issues raised then are still a priority, although it notes that some progress has been made. The EU recognises that our knowledge of climate change has expanded considerably over the last decade, but would again draw attention to the key areas referred to in this submission where it believes there may be gaps in the international research activities with respect to the needs of the Convention.

Although international research is increasingly integrated and interdisciplinary, the EU suggests that there is a need to continue to develop a comprehensive approach to the climate change problem. This would include strengthening of the dialogue between scientists and the policy community to better use scientific results in the development of policies on both mitigation and adaptation. The science conference hosted by the UK in Exeter in February – "Avoiding Dangerous Climate Change" showed the importance of such an approach and the research gaps that still exist (http://www.stabilisation2005.com/). The EU therefore suggests that a key priority would be to initiate an international programme or framework that would:

A) Assess global and regional impacts and risks associated with various greenhouse gas stabilisation levels and emission pathways and taking into account adaptation. This should also include better estimates of thresholds and probabilities for abrupt, or irreversible events, and assessment of the risk of the possible amplification (or amelioration) of anthropogenic climate change.
B) Assess the economic, environmental and social costs and benefits associated with different stabilisation levels and emission pathways and the technological and adaptation scenarios associated with each, including improved understanding of factors affecting resistance to change and learning processes.

The EU would also note that the G8 science academies and those of China, India and Brazil in a statement issued in July had recommended that governments should be urged to
'*launch an international study to explore scientifically informed targets for atmospheric greenhouse gas concentrations, and their associated emissions scenarios, that will enable nations to avoid impacts deemed unacceptable'* (e.g. Royal Society http://www.royalsoc.ac.uk/)

In this regard the EU commends the establishment of the Earth System Science Partnership, which is an important step towards the integrated global research needed to tackle climate change (http://www.essp.org/about_essp.html).

Other Research Issues

The EU also notes that progress needs to continue to be made on:

- Reducing the uncertainty in the sensitivity of the climate system to greenhouse gases and other forcings.
- Improving the quantification of the anthropogenic component of observed changes in climate, and improving the estimates of natural influences and natural variability.
- Improvements in modelling regional and sub regional climate change, for integrated assessment of impacts, vulnerability and adaptation, including the size and frequency of extreme events (storms, floods, droughts, etc).
- Research on methodologies, technologies, timing and costs of adaptation.
- Assessing integrated approaches to adaptation including its limits, and mitigation in the framework of strategies for sustainable development.
- Assessing how regional/national development strategies can simultaneously meet development priorities and address climate change.
- Assessments of the constraints and opportunities for deployment of low GHG emitting technologies.

The above research activities should be seen in the context of the policy relevant questions addressed by the IPCC in the Synthesis Report of the TAR. The consideration of future research needs will be an on going process and the EU notes that the publication of the IPCC's 4th Assessment Report in 2007 is likely to revisit these questions and update such research needs. The EU and its member states are already working on many of these issues through its national programmes and the EU's Framework Programmes (http://europa.eu.int/comm/research/).

Conclusions

The EU looks forward to considering these issues at the twenty fourth session of SBSTA, and the concurrent special side event to enhance communication between climate change research organizations and the SBSTA. The EU notes the developments in international cooperation on research, and would like to express a willingness to engage with others in the global research community.

The EU invites the representatives of the research programmes to prepare a paper indicating how they plan to address the research issues raised including its proposal for an integrated international programme referred to in paragraphs A and B for discussion at SBSTA 24.

PAPER NO. 5: UNITED STATES OF AMERICA

Submission of the United States
Views on Research Needs and Priorities Relating to the Convention, Including Information Relating to the Enhancement of Capacity of Developing Countries to Contribute to and Participate in Climate Change Research
January 15, 2006

INTRODUCTION

The 22nd Session of the Subsidiary Body for Scientific and Technical Advice in May 2005 (SBSTA-22) invited Parties to submit their views on "identified research needs and priorities relating to the Convention, including information relating to the enhancement of the capacity of developing countries to contribute to and participate in climate change research."

It is clear that a strong focus on research is critical to reducing uncertainties essential to informed decision making. The United States welcomes a discussion of research priorities for the scientific community of relevance to the deliberations of the U.N. Framework Convention on Climate Change, and notes the importance of enhancing developing country participation in climate change research.

There are legitimate and substantial differences in national perspectives on climate change, and the value of scientific research is that it can help to bridge and reduce differences among Parties with respect to the nature and timing of policy responses. The Convention can play a valuable role by highlighting research needs for policy makers, so that adequate focus and resources are brought to bear. At the same time, it is equally important that SBSTA recognize the value of international science priorities that evolve "bottom-up", from the research communities themselves.

The United States wishes to thank the Secretariat for its efforts to synthesize the research discussions from SBSTA 17 and SBSTA 20. As the Secretariat will be including information from those documents and from the key uncertainties identified in the TAR, in the synthesis that will be provided to the international research programs prior to the special side event at SBSTA 24, we do not repeat in detail already provided U.S. views on research priorities. Instead, we highlight areas previously mentioned and note additional topics worthy of further consideration by the scientific community.

IDENTIFIED RESEARCH PRIORITIES TO MEET NEEDS OF CONVENTION

Research priorities should focus on specific scientific concerns and reflect the key uncertainties identified in the IPCC Third Assessment Report. The United States offers below specific research topics we believe would be worthy of consideration in a discussion on research priorities with regard to climate change science, impacts, adaptation, and vulnerability and mitigation, given their relevance to Convention processes. These research topics, described in more detail in previous U.S. submissions, in our National Communications, and in the U.S. CCSP Strategic Plan, include:

- modeling climate change, especially at regional and local levels;
- reducing uncertainties with regard to both human-induced and natural factors, as well as the feedbacks within the climate system that determine its sensitivity to changes in forcing, such as the role of carbonaceous aerosols;
- improving understanding of potential implications of different atmospheric concentrations of GHGs, including evaluation of the uncertainties associated with climate scenarios, sensitivity of key systems, and adaptive capacity;
- reducing uncertainties surrounding potential impacts on physical and biological systems and providing an integrated assessment of alternatives, especially adaptive responses;
- improving decision models to capture the benefits and costs associated with climate change, considering both adaptation and mitigation; and,

- enhancing observation and data management systems to generate the comprehensive set of variables needed for climate-related research and to integrate space-based and in situ observations for the atmosphere, ocean, and land.

ENHANCEMENT OF THE CAPACITY OF DEVELOPING COUNTRIES TO CONTRIBUTE TO AND PARTICIPATE IN CLIMATE CHANGE RESEARCH

International coordination and cooperation are essential to improve understanding of climate variability and change. Two key priorities are enhancing global research capacity and expanding coverage of Earth observations, including through continued support of existing international global change research programs and scientific activities. The United States supports development of scientific capabilities and the application of results in developing countries in order to promote the fullest possible participation by scientists and scientific institutions in these countries.

Development of improved science-based resources to aid in decision-making is critical to support planning, adaptive management, and policymaking, encourage development of new methods and models that facilitate economic analysis, decision-making under conditions of uncertainty, and integration and interpretation of information from the natural and social sciences. For example, assessment of potential adaptive responses, including estimating effectiveness and costs, and the incorporation of economic, social, and biophysical data into decision support tools for the prioritization of adaptive responses.

Also critical to decision-making are improved climate data and information. We cannot underestimate the contributions of developing countries in furthering our understanding of the climate system. Capacity building is an essential tool for increasing capability for climate monitoring and performing analyses of the observed climate. Without these capabilities, our predictive capabilities for the climate system are severely limited. Infrastructure development to improve access to existing data is critical, as is enhancing linkages among geospatial, oceanic, and terrestrial data sets. The Global Climate Observing System (GCOS) cooperation mechanism and the Global Earth Observation System of Systems (GEOSS) provide strategies for more coordinated approaches to these issues.

It is critical to ensure that the wealth of research and data already produced, and that will be produced in future, is available to decision-makers at local, national, regional, and international levels. Infrastructure development to improve access to existing data is critical, and of particular use to developing countries and their ability to benefit from and better participate in global change research. Also, as past discussions under this agenda item have pointed out, enhancing the linkages among geospatial, oceanic, and terrestrial data sets, is critical for decision making at global, regional and national levels.

The IPCC Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA) is examining ways to address three categories of problems: 1) poor data access; 2) lack of appropriate, regionally-oriented data products and information for decision making; and 3) training. SBSTA can make a real contribution by highlighting the need for countries to work more closely with existing groups, such as System for Analysis Research and Training (START), Inter-American Institute for Global Change Research (IAI), Asia-Pacific Network for Global Change Research (APN), TGICA, and others, to identify specific projects to enhance research capacity, including data access and development of data products appropriate to limited computational and data management resources in developing/transition economy countries.

Equally important to this endeavor are efforts by developing countries to share their climate data. Developing country representation in international climate change research would be enhanced not only by improving observation systems, but by the willingness of more developing countries to share their climate data. Developing countries also can enhance their participation in international climate change research programs through encouragement and incorporation of such research into their sustainable development planning.

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