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

Information and views on socio-economic information

Submissions from Parties

Addendum

1. In addition to the six submissions contained in document FCCC/SBSTA/2007/MISC.21, one further submission has been received on 9 November 2007.

2. In accordance with the procedure for miscellaneous documents, this submission is attached and reproduced* in the language in which it was received and without formal editing.

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SUBMISSION FROM THE UNITED STATES OF AMERICA

Submission by the United States of America providing information and views on matters relating to the availability of information on the socio-economic aspects of climate change and improving the integration of socio-economic information into impact and vulnerability assessments, including information on the development of socio-economic scenarios and for understanding adaptive capacity, including:
(a) Existing approaches and available data;
(b) Needs, gaps, barriers and constraints;
(c) Ways and means to improve availability and access to relevant information, including information on costs and benefits, as well as its better integration into impact and vulnerability assessments.

Introduction
The United States welcomes this opportunity to express our views on matters related to the socio-economic aspects of climate change and its integration into impact and vulnerability assessments.

Climate plays an important role in shaping the environment, natural resources, infrastructure, economy, and other aspects of life in all countries of the world. Therefore, variations and changes in climate can have substantial environmental and socio-economic implications. The United States believes socio-economic considerations are fundamental to understanding climate change impacts. Indeed, when considering either impacts or vulnerability, socio-economic information is as, if not more, important than findings from the physical sciences. As decision-makers consider potential adaptation responses, they increasingly require information about the types, extent, and severity of impacts to key resources at local and regional scales. We expect this demand to continue to grow and see a need to augment socio-economic research efforts and improve integration of available information through enhanced decision support activities. Below we describe some of the key approaches taken by the Unites States to address these issues.

Sub-Section Reference
A) Existing approaches and available data;
B) Needs, gaps, barriers and constraints;
C) Ways and means to improve availability and access to relevant information, including information on costs and benefits, as well as its better integration into impact and vulnerability assessments.

U.S. Climate Change Science Program (CCSP)

Overview
The Climate Change Science Program (CCSP) incorporates the U.S. Global Change Research Program (USGCRP), established in 1988, and the Climate Change Research Initiative (CCRI), started in 2001. The CCSP was formed in 2002 as part of a new cabinet-level management structure to oversee public investments in global and climate change science and coordinates research across thirteen U.S. federal agencies. Efforts are directed at examining the state of the future climate and effects of a changed climate on ecosystems, society, and the economy. In addition, the CCSP also explores the application of knowledge of ongoing and projected changes to decision making.

Historically, the primary focus of U.S. climate research has been on improving fundamental understanding of the climate system through improved climate science, modeling, and projections; however, as the science matures there is an increasing emphasis on addressing and incorporating socio-economic considerations. These socio-economic efforts have two primary areas of emphasis-1) understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes in order to estimate impacts and gauge vulnerability, and

2) explore the uses and identify the limits of evolving knowledge to manage risks and opportunities related to climate variability and change.

A) Existing approaches and available data
CCSP draws on many different sources of information, including analyses utilizing prehistoric information, direct observations, and model-based projections to address the socio-economic aspects of climate change. Sponsored socio-economic research examines a wide range of potential impacts on societal needs such as water, health, and agriculture, as well as potential impacts on natural terrestrial and marine ecosystems. Examples of this work include: analysis of water availability and understanding natural variability in, and modeling future projections of, flows in the western U.S. which suggest current water management systems may be insufficient to respond to future climate conditions. Other projects have addressed impacts on human health, including assessing the probability of future heat waves and examining the correlation between year-to-year climate variations and malaria outbreaks.

B) Needs, gaps, barriers and constraints
A recent review of the CCSP by the National Research Council (NRC) of the National Academy of Sciences indicated much important research in human dimensions has been completed. In particular, this review noted substantial progress had been made documenting impacts of climate change on societal well-being in the U.S. and other countries, and providing initial insights into decision-making under uncertainty. Also noted was that much of this research has been stakeholder-driven and has resulted in useful findings for decision-makers. However, the review also identified some limitations of this work. Specifically, the review indicated additional progress is needed to integrate socio-economic aspects with natural climate science to address potential societal impacts and management responses. The panel also indicated further research is required to understand the impacts of and adaptation to climate change across different sectors and geographical regions, map differential vulnerabilities, and design interventions to build community resilience. In particular, data sets that include both climate-related human and environmental data at the same spatial and temporal resolution are needed to improve the accuracy of model projections. Many relevant social data sets exist, but they are not generally available in spatial forms that are readily linked to environmental data.

C) Ways to improve availability and access to relevant information
CCSP is generating synthesis and assessment products (SAPs) that integrate research results on key issues frequently raised by decision-makers, including several targeting socio-economic issues. The SAPs are generated by researchers in a process that involves review by experts, public comment from stakeholders and the general public, and final approval by the departments/agencies involved in CCSP.

Below is a list of SAPs addressing socioeconomic issues with scheduled completion dates:

- SAP 3-3 Weather and climate extremes in a changing climate. Regions of focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands; expected completion 6/2008
- SAP 4-1 Coastal elevation and sensitivity to sea level rise; expected completion 12/2007
- SAP 4-2 Thresholds of change in ecosystems; expected completion 12/2007
- SAP 4-3 The effects of climate change on agriculture, biodiversity, land, and water resources; expected completion 12/2007
- SAP 4-4 Preliminary review of adaptation options for climate-sensitive ecosystems and resources; expected completion 12/2007
- SAP 4-5 Effects of climate change on energy production and use in the United States; expected completion 10/2007
- SAP 4-6 Analyses of the effects of global change on human health and welfare and human systems; expected completion 12/2007
- SAP 4-7 Impacts of Climate change and variability on transportation systems and infrastructure: Gulf Coast Study; expected completion 12/2007

- SAP 5-1 Uses and limitations of observations, data, forecasts, and other projections in decision support for selected sectors and regions; expected completion 12/2007
- SAP 5-2 Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decisionmaking; expected completion 12/2007
- SAP 5-3 Decision support experiments and evaluations using seasonal to interannual forecasts and observational data; expected completion 12/2007

U.S. National Oceanic and Atmospheric Administration (NOAA) Regional Integrated Science Assessments (RISAs), Sector Applications Research Program (SARP), and Transition of Research Applications to Climate Services (TRACS) Program

Overview

The National Oceanic and Atmospheric Administration's (NOAA) climate mission is to understand and describe climate variability and change to enhance society's ability to plan and respond. The long-term climate efforts of NOAA are designed to develop a predictive understanding of variability and change in the global climate system, and to advance the application of this information in climate-sensitive sectors through a suite of process research, observations and modeling, and application and assessment activities.

As climate sciences continue to make great strides in producing knowledge that can aid decision makers, one of the key issues NOAA faces is how can we improve the link between climate sciences and society. NOAA is expanding its capacity to address these questions through programs such as the Regional Integrated Sciences and Assessments (RISA), Sectoral Applications Research Program (SARP), and Transition of Research Applications to Climate Services (TRACS) Program. These programs are further described below.

A) Existing approaches and available data

Regional Integrated Science Assessments (RISAs)

Established by NOAA in the mid-1990s, RISA supports integrated, place-based research to expand decision-makers' options and address society's needs and concerns at the regional level. RISA teams are comprised of researchers from the physical, natural, engineering and social sciences who work together with stakeholders in a region to determine how climate impacts key resources and how climate information could aid in decision making. Currently, there are eight RISA teams organized in different regions of the U.S.

These teams examine a range of issues sensitive to climate and in need of socioeconomic analysis. RISA scientists provide information that decision makers can use to cope with drought, understand climatic influences on wildfire, and assess climate impacts on the transportation sector, coastal communities and human health. Stakeholders can use such information to evaluate potential climate change impacts on water supplies and hydroelectric power and support disaster management planning. The RISA program web site is: http://www.climate.noaa.gov/cpo_pa/risa/.

Sector Applications Research Program (SARP)

NOAA established the Sector Applications Research Program in 2005 to generate new research-based insights and applications for climate information in support of decision making in high priority, climate-sensitive sectors. SARP teams consider social, economic, health, and welfare effects of changing climatic conditions and resource decisions for specified sectors, defined by resources (such as coastal or water resources, forests, or agricultural lands) or by decision domains (such as emergency management or urban planning).

Resulting projects provide an organizing system to integrate the complex array of socioeconomic issues influenced by climate and develop linkages with specific decision makers and partners. All projects include competitively funded research, decision support development, and stakeholder outreach.

However, the specific focus of research activities and partnerships is tailored to the needs of the individual sectors. Current projects focus on Coastal Resource Management and Drought/Water Resources Management. Information about current and past SARP projects can be found at: http://www.climate.noaa.gov/cpo_pa/sarp/.

Transition of Research Applications to Climate Services (TRACS) Program
The TRACS Program (started as the NOAA Climate Transition Program in 2003) transitions experimentally mature climate information tools, methods, and processes, including computer related applications (e.g. web interfaces, visualization tools), from research into settings where they may be applied in operationally. TRACS primary goal is to generate sustained delivery of useful climate information products and services to local, regional, national, and international decision and policy makers. TRACS seeks not only to support implementation of these transitions, but also to learn from partners how to better accomplish technology transition processes for public goods applications and improved risk management. TRACS emphasizes three key elements, transitions (i.e. a focus on partnerships where technology hand-offs occur), research applications (i.e. experimentally developed and tested, end-user-friendly information to support decision making), and climate services (i.e. the routine and timely delivery of that information, including via partnerships). More information on TRACS can be found at http://www.climate.noaa.gov/cpo_pa/nctp/.

B) Needs, gaps, barriers and constraints
Over the past several years, there has been an increased demand for climate information that can be applied to specific regions or socio-economic sectors. A recent review by the National Research Council (NRC) of the National Academy of Sciences provided support for the efforts of RISA, SARP, and TRACS to provide decision-relevant climate information. However, the review also noted these programs are too small to address the full range of climate sensitive issues, geographic areas, and socio-economic sectors. With concerns over climate increasing, we anticipate the demand for such information will continue to grow.

C) Ways to improve availability and access to relevant information
RISA, SARP, and TRACS emphasize working directly with people who have a stake in climate impacts and decisions. These programs represent a new approach to decision support by not only producing a research product or tool, but also encouraging a two-way process of communication between the producers and users of climate information. By identifying specific user needs, participating scientists can target their efforts to develop relevant information that can be integrated into impact and vulnerability assessments. From an organizational perspective, RISA and SARP complement one another to provide effective geographical and topical coverage of climate-related issues in a decision-making context. The NRC review was highly complementary of this approach to provide stakeholder-driven research targeted at specific regional or decision-sector needs.

U.S. Department of the Interior and its bureaus

Overview
The U.S. Department of the Interior (DOI) manages lands, waters, and energy leases in the United States, and its actions and policies affect the people who depend upon these resources. DOI manages one in every five acres of the U.S. land mass and has a significant presence along U.S. shorelines. DOI operates dams and irrigation facilities that provide water to major metropolitan areas in the western U.S. and to farmers who generate nearly two-thirds of the Nation's produce. DOI manages leases from which one-third of the Nation's domestic energy supplies are produced. The lands and waters DOI manages account for significant contributions to alternative energies such as biomass, geothermal, solar, and wind power.

In recognition of the potential for climate change to affect DOI lands, facilities, and operations, DOI created a Climate Change Task Force to consider the potential impacts of climate change on its resources

and to suggest scientific, management, and legal and policy options for addressing these impacts. The human dimension of climate change is one area of particular concern to the department.

The United States Geological Survey (USGS), one of DOI's bureaus, is engaged in climate change research that can be used as part of the decision making process. The U.S. Bureau of Reclamation also engages in studies to assist its water managers in assessing vulnerabilities to climate change.

A) Existing approaches and available data

United States Geological Survey (USGS)

USGS provides science and data that can be used to identify potential impacts and assess vulnerabilities to climate change. USGS climate change research is organized into four major areas:

1) Hydrologic Networks and Analysis
2) Earth Surface Dynamics
3) Ecosystems
4) Geographic Analysis and Monitoring

These programs use data analysis, modeling, and field work to better understand how climate change may impact resources critical to our society. For example, research and modeling of the global water cycle has resulted in predictions of changes in water availability in different regions of the world as the result of climate change.

In addition, the USGS maintains a long term monitoring network that has been instrumental for these studies. This network includes observations of both physical and biological environments, with data such as land-cover and land-use, streamflow, species distribution, and phenology.

Bureau of Reclamation (Reclamation)

Reclamation scientists are using climate change scenarios to evaluate the potential risks to reservoir operations and water management.

B) Needs, gaps, barriers and constraints

Land and water managers have expressed a need for climate change information that can aid their decision making. In many cases, locally-scaled information is desired. At the same time, there is also a need for broader studies that help us to better understand the processes that will result in local impacts. A balance between these types of studies needs to be achieved.

C) Ways to improve availability and access to relevant information

The results of USGS studies need to be effectively communicated to decision makers in order to affect policy choices. The needs of decision makers must also be conveyed to USGS, so that its research focuses on relevant topics. The DOI Climate Change Task Force has provided a forum for some of this discussion. Additional opportunities for interaction between scientists and land and water managers would be beneficial.

The USGS and other DOI bureaus can continue to enhance the availability of information by:

- Expanding and modernizing existing observing networks.
- Integrating data from multiple agencies to create a comprehensive database and monitoring network.
- Continuing and enhancing research that increases our understanding of the complex interactions between climate and physical, chemical, and biological systems.
- Continuing and enhancing research that provides useful forecasts of climate change impacts with socioeconomic consequences.
- Reporting results to decision makers, emphasizing what is known and what is still uncertain.
- Working with resource management partners to develop adaptation and mitigation strategies and management tools.

USAID Global Climate Change Adaptation Program

USAID uses socioeconomic information, within a general livelihoods framework, to understand adaptive capacity in targeted communities. Livelihoods are the sum of ways in which people make a living. In most communities in low-income countries, poor families balance a set of food and income-earning activities against their needs. Acute food insecurity results when the failure of one or more of these strategies cannot be compensated for by other strategies. We study livelihoods because it is a critical piece of information that can reveal how, and why, people survive (or fail to survive) difficult times.

USAID has used community-level surveys to provide livelihoods information for climate change adaptation projects in Thailand and Madagascar. Livelihoods information will continue to be a critical component in understanding potential climate change impacts in adaptation projects.

The USAID-funded Famine Early Warning System Network (FEWS NET), a collaborative project with technical support from NASA, NOAA, USDA, and USGS, works with national, regional, and international institutions in FEWS countries, uses a wide variety of remotely-sensed data and livelihoods information to assess food insecurity and vulnerability to famine. A livelihoods understanding helps to place a variety of hazards (drought, floods, high prices, conflict) into a framework in which the acute impacts may be estimated, coping strategies measured, and appropriate emergency measures, if any, can be designed with a better knowledge of how they will interact with that specific environment.

As a development tool, livelihood (or food economy) analysis offers a structured approach for capturing and understanding the "story" of how villagers survive in a changing environment, and a new tool for suggesting what types of internal adaptations and external intervention opportunities are available to achieve more secure food and livelihood security. Increasingly, as weather and climate play a larger role in changing household food security and vulnerability, FEWS NET has also begun to assess patterns of continental and local climate change, in order to better understand slow-onset threats to livelihoods, and opportunities to adapt to these changing conditions.

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