CLIMATE CHANGE RESEARCH

2010 WAS A TURBULENT YEAR FOR CLIMATE CHANGE RESEARCH. THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC), WHICH JUST THREE YEARS BEFORE HAD SHARED THE NOBEL PEACE PRIZE WITH FORMER US VICE PRESIDENT AL GORE, WAS BUFFETED BY A SERIES OF ALLEGATIONS THAT CAST DOUBT IN THE PUBLIC'S MIND ABOUT THE ORGANIZATION'S IMPARTIALITY AND TRUTHFULNESS.

In August 2010, the InterAcademy Council (IAC), the Amsterdam-based organization that "produces reports on scientific, technological and health issues related to the great global challenges of our time," published Climate Change Assessments: Review of the Processes and Procedures of the IPCC.

As the title suggests, the report focused not so much on the immediate controversies surrounding the IPCC but more on how the organization could strengthen the ways in which it governs its overall operations and manages the publication of its reports.

In the following article, Roseanne Diab, executive officer of the Academy of Science of South Africa, who served as vice chair of the IAC review committee that produced the report, explains the committee's findings and recommendations.

Climate change is undoubtedly the scientific issue of our time. Its potential impact spans a broad range of fundamental societal concerns that include, for example, biodiversity, ecology, energy use, food security and public health. Adequately addressing the challenge requires strategies that speak to financial accountability and equity both between countries and across generations.

While global trends in climate change have become increasingly evident (at least for scientists), the impacts, especially on a regional and local scale, remain highly uncertain. Perhaps most importantly, climate change raises critical questions about rendering effective policy decisions in the face of enormous uncertainties – and the role that the scientific community should play in such efforts.

The vast majority of scientists agree on this much: changes in temperature and rainfall, instigated by the release of greenhouse gases into the atmosphere due largely to human activities, will have a profound impact on the state of the Earth's ecology and resources. Such impacts, moreover, will likely pose critical challenges and risks to human well-being as well.

Yet this much recent experience also tells us: devising an effective global strategy for dealing with such a complicated issue will not be easy and, in fact, may not be possible.

HIGH STAKES

What makes the stakes so high and therefore raises core ethical issues, is that the poorest and most vulnerable people living in developing countries will undoubtedly be the most adversely affected by climate change.

It is poor people who have a limited ability to adapt to climate change and it is poor people who depend on weather-dependent subsistence agriculture – and, more generally, natural resources – for their survival and well-being. Changes in temperatures and rainfall patterns and intensity will affect us all. But it will affect some more than others.

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So, how should the climate change community proceed in exploring such a complex and contentious issue? This has been the fundamental challenge that the IPCC has had to confront in publishing its reports over the past two decades.

The prevailing notion among the scientific community has been to set out the facts as best it can – to highlight the most recent research findings but to acknowledge that vast gaps in knowledge and uncertainties continue to exist.

Nevertheless critics have increasingly contended that some scientists affiliated with the IPCC have strayed into the world of advocacy.

In 2010, these varying perceptions of how the IPCC operates reached a boiling point with the unauthorized publication of private email messages written by IPCC-affiliated scientists. Critics vociferously claimed that the emails revealed the prejudices and unmasked the true intentions of climate change scientists.

BACKGROUND

The World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) established the IPCC in 1988 to help inform policy decisions on mitigation and adaptation options relating to climate change.

Through periodic assessment reports on the state of climate science and the potential impacts of climate change, the IPCC has built a commendable reputation for its competence in summarizing the level of global knowledge concerning the issue. In 2007, the scientists contributing to the IPCC were collectively awarded the 2007 Nobel Peace Prize, together with Al Gore, the former vice president of the US and 'star' of the widely distributed film *Inconvenient Truth*, which has been seen by millions of people worldwide.

However, against a backdrop of the increasing politicization of the climate-change discussions and reflecting the high stakes involved, the IPCC assessment reports have come under intense public scrutiny. Increasingly, controversies have erupted over the accuracy of its conclusions and the perceived bias of its findings.

POLITICAL VORTEX

The IPCC found itself in a political vortex in late 2009 when incriminating emails and documents hacked from the University of East Anglia's server were published in the media. Critics alleged that the emails were evidence of collusion among scientists to: withhold information that did not conform to their preordained conclusions about the seriousness of the problem; ignore or recalculate data that failed to support the case for global warming; and thwart the publication of papers written by authors who questioned global warming in scientific journals.

'Climategate', as it was popularly known, coupled with some widely publicized errors in the IPCC fourth assessment report, such as statements that Himalayan glaciers would melt by 2035, damaged the credibility of the IPCC and threatened to undermine public confidence in the reports' findings.

CALLING ON IAC

In the wake of these controversies, United Nations (UN) Secretary-General Ban Ki-moon and IPCC chair Rajendra K. Pachauri asked the InterAcademy Council (IAC) to conduct an independent review and recommend ways to improve the IPCC's processes and procedures.

IAC was selected, in part, because it represents the collective expertise and experience of merit-based national science academies from around the world. IAC, in the eyes of the UN and IPCC, had both the knowledge and standing to offer an expert, impartial assessment of the panel's efforts.

The IAC review, conducted between April and August 2010, benefitted from discussions with IPCC and UN officials, as well as with scientists holding

wide-ranging views of IPCC processes and procedures. A broadly disseminated questionnaire yielded more than 400 responses from researchers across the globe.

SUCCESS BUT...

The IAC review committee concluded that the IPCC process had been an overall success. Indeed the review committee stated that IPCC deserves a great deal of credit for raising public awareness about climate change issues. The committee also praised IPCC for sustaining the involvement of the 194 participating governments and for maintaining the enthusiastic commitment of thousands of scientists over the past two decades – all of whom made their contributions on a voluntary basis.

By creating a unique and productive partnership between scientists and governments, the IAC review committee noted that IPCC has raised the level of scientific debate on a global scale and helped to influence the science agendas of many countries – all for the better.

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Nevertheless, the IAC review committee was critical of many of IPCC's governance and management procedures and processes.

To overcome the IPCC's shortcomings, the committee offered a number of key recommendations to strengthen how the organization both governed itself and interacted with the public. It observed that the IPCC has consistently failed to keep pace with the growing public demand for accountability and transparency that has taken place since IPCC was created in 1988.

Specifically, the review committee concluded that IPCC's management structure was not fully equipped to respond to the intense public and media interest in its work and, more generally, the debates engulfing the issue of climate change, which were becoming more heated and intense.

To address such shortcomings, the committee called for the creation of an executive committee to guide and evaluate the IPCC's decision-making process on a continual basis; the appointment of an executive director to oversee the IPCC secretariat in Geneva, Switzerland, and manage its day-to-day operations; the adoption of stringent conflict of interest guidelines for participating scientists to avoid the appearance of deriving personal benefits from being affiliated with IPCC; and a broad expansion of communication efforts to better inform the public and effectively respond to the media.

In addition, the review committee recommended one-term, non-renewable appointments for the IPCC chair and its three working group co-chairs, corresponding to the timeframe of one assessment.

The committee reasoned that each of these voluntary positions is held for lengthy, six-year terms. Appointing new chairs and co-chairs once every six years would help generate fresh perspectives and foster a working environment that would encourage innovative approaches for the challenges that would arise during each new round of the assessment reports.

FOLLOWING GUIDELINES

The review committee found that adequate policies and guidelines were largely in place for the production of the assessment reports. However, the committee

concluded that these policies and guidelines were not always followed or applied consistently by the three working groups.

For example, the mistaken conclusion that there was a "high probability" that the Himalayan glaciers would disappear by 2035, as reported by working group II, was attributed to a failure of the review process.

IPCC procedures require that all chapters undergo two formal reviews: the first solely by experts appointed as reviewers and the second by a mix of scientific experts and government representatives. In some cases, there is also an informal review of the preliminary text before the formal review process takes place.

At minimum, two review editors are appointed for each chapter. They are responsible for ensuring that the chapter's authors address the reviewers' comments, especially those involving controversial issues.

Reviewers, in fact, questioned the report's conclusion that glaciers in the Himalayans would disappear by 2035. Yet, the comments were inadequately considered and the error slipped through.

The committee concluded that stronger enforcement of existing IPCC review procedures would minimize the chance of errors cropping up. It therefore recommended strengthening the role and authority of the review editors. The committee also urged that review editors take steps to ensure that the reports fully reflect disagreements among scientists and that full consideration be given to alternative views. More specifically, the committee recommended that lead authors be required to explicitly document that they have considered the full range of scientific views concerning each of the issues that has been examined.

GREY AREAS

The use of grey literature from unpublished or non-peer-reviewed sources – for example, reports by government agencies and nonprofit organizations – has proven to be particularly controversial.

On balance, the review committee found that such information is both relevant and appropriate. Yet, it strongly urged that IPCC's guidelines for evaluating grey literature be revised and strictly enforced to ensure that unpublished and non-peer-reviewed literature is sufficiently vetted for accuracy and that this literature is appropriately tagged as non-peer-reviewed information in the report.

The committee also called for more consistency in how each working group characterizes uncertainty. It found that in the fourth assessment each working group used a variation of IPCC's "uncertainty guidelines" and that the guidelines themselves, once published, were not always followed. For example, the report of working group II contains many statements that were assigned "high confidence", yet the group presented little evidence to support the conclusions.

The committee recommended that in future assessments, working groups avoid presenting numerical

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quantified assessments (for instance, stating that there is a 95% certainty that an event will occur or a trend will unfold) when the evidence fails to support such precise findings. Instead, the committee recommended that the working groups avoid probabilistic statements and instead present descriptive qualified statements of their understanding of an issue – and then explain both the amount of evidence that is available to support such a statement and the level of agreement that exists among experts (for example, using such terms as "high agreement" and "much evidence").

The need for transparency was another critical issue that surfaced during the IAC review, particularly in interviews with scientists.

A number of scientists who participated in the IPCC process contended that they did not fully understand the process by which the information was collected and reviewed. Equally important, they complained that the procedures used to select working group co-chairs and authors remained largely opaque and often inscrutable.

To address these shortcomings, the IAC review committee recommended that the selection become much more transparent.

AND FOR DEVELOPING COUNTRIES...

Both IPCC participants and observers have expressed concerns about the limited level of involvement by scientists from developing countries ever since the IPCC's inception.

It is important to note that important progress has been made in addressing this challenge over the past two decades. The progress is in part due to strenuous efforts by the IPCC and in part due to the growing commitment to science and science-based development among developing countries.

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For example, governments in developing countries now represent nearly 70% of the IPCC member states. Their presence has given the South a strong voice in general discussions about the direction of the IPCC. Nevertheless, when it comes to the detailed research agendas formulated by the scientific community, progress to date has been much more limited. Indeed more than 75% of the authors of the IPCC's assessment reports still live and work in developed countries.

The committee noted that full participation by developing countries is necessary to build worldwide trust, confidence and ownership in the process, and to ensure that the effort takes full account of the interests

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and needs of all countries.

The lack of participation by scientists from developing countries can be attributed to the chronic challenges faced by scientists in poor countries with weak scientific infrastructures. These challenges include the exclusive use of English to communicate during the preparation of the working group reports, a lack of support by their home institutions, limited access to literature, and the small number of qualified scientists working on climate-change issues.

In the interviews that were conducted during the IAC review, many African scientists drew attention to their isolation and the difficulties that they have faced in participating in the IPCC process while maintaining heavy teaching loads and having limited, often delayed, access to the data and literature. Overcoming these challenges will require extensive investment in human capital and scientific infrastructure in developing countries.

POSTSCRIPTS

The IPCC considered the findings of the IAC review report at its plenary session in Busan, South Korea, in October 2010. It agreed to implement many of the recommendations immediately, including the report's recommendations on how to deal with discussions of uncertainty and the conditions under which to include grey literature.

In addition, the IPCC agreed to create a task group to examine the full range of issues related to the establishment of an executive committee, as well as possible reforms in the governance of the secretariat and the selection and responsibilities of the chair and co-chairs.

At its annual meeting in Abu Dhabi, held in May 2011, the IPCC agreed to having report editors and authors complete a form declaring any conflicts of interest and to establish a system for identifying errors that would allow for input from both the scientific community and public.

In addition, the IPCC agreed to continue to permit non-peer-reviewed literature to be cited in the reports but only when it could be shown to be scientifically and technically valid. Print and broadcast media, as well as blogs and social networks, would not be considered acceptable sources of information for IPCC reports. And the IPCC agreed to establish an executive committee that would have an oversight role in the management of the reports.

Preparations for the fifth assessment report, which is scheduled for publication in 2014, are under way. The IPCC has expressed hope that the report will benefit from the efforts of the IAC.

As Harold T. Shapiro, chair of the IAC review committee, noted in the preface to the report: "IPCC can remain a very valuable resource, provided it can continue to highlight both what we believe we know and what we believe is still unknown and to adapt its processes and procedures in a manner that reflects both the dynamics of climate science and the needs of public policy for the best possible understanding of a changing global climate, its impacts and possible mitigation initiatives." ■

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To review the complete text of the IAC report,
Climate Change Assessments: Review of the Processes and Procedures of the IPCC,
see reviewipcc.interacademycouncil.net.