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The IPCC report-writing process
Briefing note

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1. Introduction to the IPCC

Set up in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP), the role of the Intergovernmental Panel on Climate Change (IPCC) is "to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation".

The current membership of the IPCC is composed of a panel of 195 countries which are also members of the WMO and UNEP. The panel meet annually in plenary, joined by a number of observer organisations. The work of the IPCC is guided by a set of principles and procedures.

The IPCC is currently organised into three working groups and a task force. Working Group I deals with 'The Physical Science Basis of Climate Change', Working Group II with 'Climate Change Impacts, Adaptation and Vulnerability' and Working Group III with 'Mitigation of Climate Change'. Among the tasks carried out by the working groups is the production of regular technical and scientific assessments of climate change, usually in three volumes, alongside a synthesis report.

A bureau, made up of 31 members, including the IPCC chair, vice-chair and vice-chairs of each of the themed working groups, oversees the assessment and provides guidance on wider managerial and strategic issues. Both are underpinned by an IPCC secretariat, which provides support to both the panel and the bureau.

Each assessment report is produced by writing teams of lead authors, led by coordinating lead authors and supervised by review editors, who work collaboratively to review the latest research and evidence. The authors and editors, who work on a voluntary basis throughout, are chosen from lists drawn up by member governments, observer organisations and the bureau (co-chairs and vice-chairs) of the working group or task force producing the report. The bureau of the

working group or task force selects the authors from these lists and from other experts known through their publications and work.

Each working group contribution is composed of three parts: a set of chapters, a technical summary, and a summary for policymakers. Each summary for policy makers is approved by members of the Panel in plenary session.

Four assessment reports have been published since the IPCC was established. The First Assessment Report was published in 1990, with the Second Assessment Report in 1995, the Third Assessment Report in 2001, and the Fourth Assessment Report in 2007. The Fifth Assessment Report (AR5) is due to be published in 2013 and 2014.

A number of revisions have been made to the process, following a small but significant error found in 2010 in the contribution of Working Group II to the Fourth Assessment Report. As a result, the InterAcademy Council, composed of the world's leading national science academies, was invited by the IPCC to review its processes and procedures. The IPCC made a number of improvements as a result of the review, the report of which was published on 31 August 2010.

2. The Fifth Assessment Report

The summary for policy makers of the contribution of Working Group I will be published on 27 September 2013 following a plenary in Stockholm, Sweden between 23 and 26 September. The draft versions of the technical summary and chapters will be published on 30 September. A total of 209 lead authors and 50 review editors from 39 countries and more than 600 contributing authors from 32 countries have been involved in the preparation of Working Group I's report. The process of preparing the contribution of Working Group I began in March 2009.

The summary for policy makers of the contribution of Working Group II will be published on 30 March 2014. The summary for policy makers of the contribution of Working Group III will be published on 12 April 2014. The final synthesis report will be published on 1 November 2014.

3. How are the IPCC assessment reports prepared?

At the outset of the process, key lessons learned from the previous assessment are reviewed. Bureau members, including the IPCC chair and two co-chairs (one from a developed country, one from a developing country) for each working group are nominated by governments and elected by the Panel, who then agree the remit of each working group, and the timeframe to work towards.

Based on initial scoping meetings, which are held to identify the information needs of participating governments and to delineate the broad scope of the reports, the IPCC bureau then develops a detailed report outline, which is reviewed and

approved by the representatives from member governments, who agree the scope and detailed structure of the IPCC assessment and each chapter.

Each of the three IPCC working groups has two co-chairs who oversee the drafting and preparation of the report, co-ordinating lead authors and lead authors who write the content based on the latest available scientific evidence, and review editors who ensure that due account is taken of comments from reviewers and governments.

Member governments, observer organisations and the IPCC bureau nominate experts to prepare the report. The final list of authors and editors is selected by the bureau and approved by the panel. Those not selected as authors can instead register as expert reviewers to provide comments on the early drafts.

Authors are selected for their scientific, socio-economic and technical expertise. The selection process encourages geographical and gender representation, and seeks to include experts with varying levels of experience of the IPCC, specifically including some authors who have not contributed to IPCC reports before. For Working Group I, 29 coordinating lead authors, 209 lead Authors and 50 review editors were appointed. Of these, 28 are from the UK. In addition, the writing teams invited and received input from over 600 contributing authors.

IPCC reports prioritise peer-reviewed literature as the basis of the scientific evidence reviewed or the assessment reports wherever available. However, recognising the value of government and industry 'grey literature' reports, which can add breadth and depth to the assessment, these can be cited in IPCC chapters if authors are satisfied that they are sufficiently robust and of high quality.

The IPCC assessment report process includes a cut-off date for literature to be considered for inclusion. The contribution of Working Group I excludes papers that have not been accepted for publication in a journal by 15 March 2013. Working Group I's contribution cites more than 9200 publications, allowing a comprehensive and up-to-date picture of the scientific literature on the physical basis of climate change.

The writing teams first create an initial draft text (the 'zero order draft') which follows the agreed structure of the report. This draft is reviewed internally by scientists, before the first order draft is then created for wider external review.

Once the first order draft is written, the text is reviewed by scientific experts and those who have signed up to act as reviewers, who submit formal comments on the draft. Reviewers include experts across disciplines and regions who are nominated by governments, observer organisations and the bureau, alongside individual reviewers who can sign up to comment on the draft texts, on the condition that the contents of the report are treated as confidential throughout. For Working Group I's contribution to AR5, the first order draft text received 21,400 comments from 659 expert reviews from 47 countries.

A **second order draft is** then created, which goes through the same review process as the first order draft, but with government representatives also able to provide comments. For Working Group I's contribution to AR5, the second order draft received 31,422 comments by 800 expert reviews from 46 countries and 26 governments.

Text changes that are made following a review of the comments on the early drafts are overseen by at least two review editors (including developing and developed country representation) for each chapter. Final approval of any changes to the text rests with the lead authors for the chapter in question.

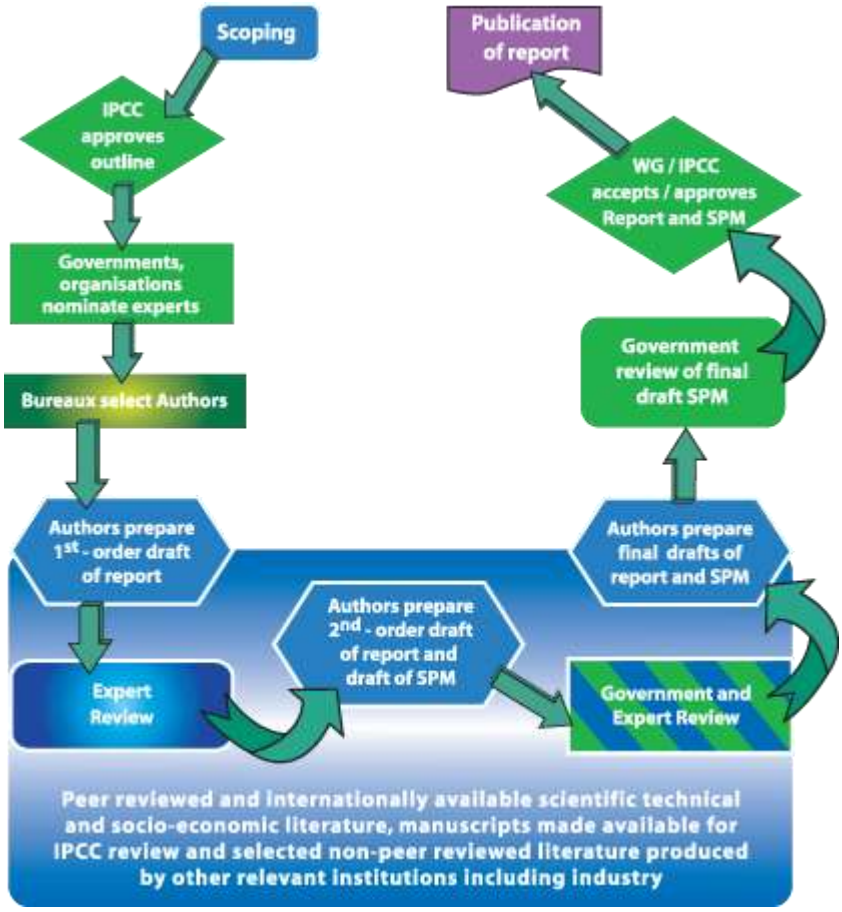
Review editors also have responsibility for ensuring that any controversial issues are dealt with appropriately, and that review comments provided on the drafts are given due consideration by the writing teams, so that the report is a sufficiently comprehensive assessment of the scientific evidence available at the time of writing.

Once a **final draft** is produced, the authors also write the shorter **summary for policy makers** (SPM), which is issued to governments for comment, alongside the final versions of the report chapters. 32 governments provided a total of 1855 comments on Working Group I's summary for policy makers.

The final stage is a plenary at which the representatives from the member governments review the SPM text in meetings held over several days with the writing teams. The SPM text is approved line-by-line by member governments and sections can only be re-drafted if the proposed changes remain consistent with the underlying chapters. Scientists have the opportunity to explain the text to government representatives and have veto over text changes that do not represent the underlying scientific evidence. This review session is due to be held in Stockholm, Sweden, between the 23 and 26 September 2013.

While the SPM is formally approved at the end of the assessment process, governments also then accept the final contribution of the working group which accompanies the summary for policy makers, agreeing that it "presents a comprehensive, objective and balanced view of the subject matter". Approval of the SPM by member governments "signifies that it is consistent with the factual material contained in the full scientific, technical and socio-economic assessment of the special report accepted by the Working Group".

A summary of the report-writing process:



Source: IPCC.

4. What are the main limitations of the IPCC process?

The IPCC process and its output reports have been subject to a number of criticisms in recent years, exacerbated by the inclusion of a small but significant error about the rate of melting of the Himalayan glaciers in contribution of working group II to the Fourth Assessment Report. In March 2010, the InterAcademy Council (IAC), an independent body set up by the world's science academies, was asked by the chair of the IPCC and the United Nations Secretary-General to lead an independent review of the IPCC's processes and procedures. An expert committee was established to make recommendations to ensure the future quality and robustness of the IPCC's reports. Scientific and engineering academies were contacted for nominations for experts to take part in the review, resulting in the appointment of 12 experts across countries and across disciplines.

The areas investigated by the expert panel of the InterAcademy Council included IPCC governance and management and potential conflicts of interests and procedures for electing the bureau. The expert panel also sought to provide clarity and strengthen procedures around the IPCC report review process, clarify the use

of ‘grey literature,’ the selection of authors and the expression of uncertainty in the reports.

A number of shortcomings in the IPCC’s processes and procedures were identified by the IAC report, which was published in October 2010. These ranged from the static management structure and selection of literature for inclusion in the report, to the complex review process, differing presentations of uncertainty across reports, and a lack of transparency in the review process. The IAC expert panel provided a number of recommendations to help improve the IPCC’s processes and procedures. The IPCC has adopted the majority of these recommendations, where feasible, within the timeframe ahead of the publication of AR5. The IPCC established four task groups to address the issues raised in the IAC report, covering procedures, governance and management, conflict of interest and communications. A summary of the main recommendations adopted and procedural and protocol changes made following the publication of the IAC report is provided in the following sections.

5. The InterAcademy Council (IAC) report: highlights of subsequent revisions to the IPCC structure and review process

Governance and management of the IPCC

The IAC report identified that the evidence assessment task, which sits at the heart of the IPCC report process, has become increasingly complex given the significant increase in the volume of evidence to review and in the number of comments received on early drafts. The IAC also observed that the management structure of the IPCC had changed little, despite the increasing size and complexity of the task in hand.

For example, the IAC report noted that “the number of relevant publications that inform the drafting of an IPCC assessment grew from about 5000 for 1991-1995 to about 19,000 for 2001-2005”. Between the First Assessment Report in 1990 and the Fourth assessment Report in 2007), the number of signed-up reviewers doubled (increasing the volume of review comments), and the length of reports quadrupled. The IAC recommended a number of changes to the IPCC management structure and governance to enhance its effectiveness.

The IPCC panel agreed, at its 33rd session, to establish a new executive committee and set out its terms of reference, composition, and mode of operation. The panel also set out and agreed the terms of reference, roles, responsibilities and qualifications required by bureau members. The panel also agreed to limit the IPCC chair, vice-chair and co-chairs of the working groups to “one term in the same position”.

The IAC also identified a need for a clear conflict of interest policy, covering all those directly involved in the IPCC reports, accompanied by the establishment of a Committee on Conflict of Interest to review decisions. In May 2011, the panel

adopted an IPCC Conflict of Interest Policy and agreed to implement this by no later than its 35th session in June 2012. The adopted policy sets out the principles for assessing potential conflict of interests, and the process for reviewing them, and describes disclosure forms for authors to complete. Finally, the panel agreed at its 34th session in 2011 to adopt the implementation procedures about potential conflicts of interest, and decided to establish a Conflict of Interest Committee and Expert Advisory Group.

Treatment of uncertainty in IPCC reports

The IAC pointed out that each working group was using a different expression of uncertainty and that there was a need for greater consistency across reports when describing uncertainty. They also found evidence in the drafts of previous reports that authors were making vague statements that could be expressed with "high confidence", but pointed out that these statements were topline and so added little to the scientific body of evidence.

The IAC recommended that when communicating uncertainty in the IPCC reports, authors should convey both the level of expert agreement and the amount of evidence actually available and express uncertainty using the "level of understanding" scale. They also recommended that authors should accompany this with probabilities (in numbers) to help improve understanding of uncertainty. Finally, the IAC review identified a need for a clear decision-making evidence trail, where "chapter lead authors should provide a traceable account of how they arrived at their ratings for the level of scientific understanding and likelihood that an outcome will occur".

Consequently, in November 2011, the IPCC drafted a guidance note for lead authors of AR5 on "consistent treatment of uncertainties", which sets out a common approach to communicating uncertainty, and which was endorsed by the IPCC panel at its 33rd session. This note includes guidance on how to evaluate the evidence and also addresses the need for authors to avoid topline statements that *were "*so general they lose substantive meaning".

Identifying and handling potential report errors

The IAC report highlighted the risk that review comments might not be fully examined or that errors in a chapter text could be overlooked and noted that "…some existing IPCC review procedures are not always followed and that others are weak. In particular, review editors do not fully use their authority to ensure that review comments receive appropriate consideration by lead authors and that controversial issues are reflected adequately in the report". The IAC report noted there was a clear need to revise the review process to ensure sufficient checking of report drafts to avoid the introduction of potential errors, and to provide clear guidance on the types of literature to review.

The IPCC has since set out in Annex 3 of Appendix A to the Principles Governing IPCC work a (now-adopted) protocol for addressing possible errors in IPCC reports. This protocol only relates to correcting errors that should not have been made given the information available at the time a report was written, and "it cannot be used to propose the consideration of additional sources not cited in the existing assessment, unless directly relevant to an error or fact or accuracy". The protocol also is not intended for errors where the literature cut-off date has passed or where new knowledge comes to light post-publication.

The protocol sets out clear principles for assessing and correcting errors (where applicable) and a decision-tree for doing so, including clear responsibility for decision-making and an escalation procedure if the error claim is warranted. It also notes that "corrections should be based on consensus, consistent with the IPCC principles that form the foundation for the underlying reports".

Guidance on literature for inclusion

The IAC report highlighted a lack of clear guidance about the type of information to be included and assessed in the IPCC reports, and recommending that the IPCC "should strengthen and enforce its procedure for the use of unpublished and peer-reviewed literature". Consequently, in Annex 2 of Appendix A to the Principles Governing IPCC work, clear guidance has been provided about the need to prioritise peer-reviewed literature where this is available, but also recognises the value of non-peer reviewed sources which "may include reports from governments, industry, research institutions, international and other organisations or conference proceedings". It notes that responsibility lies with author teams to check that any research included is of sufficiently high quality and robust, and stresses that social media, blogs, broadcast media and personal communications should not be included as evidence.

Regional chapters and identification of relevant experts

Some chapters of the IPCC assessment reports focus on particular regions and draw on expert authors with particular regional expertise. Recognising that some experts were not necessarily located in the regions studied, the IAC recommended that authors for regional chapters should include both in-region experts alongside experts from outside if they offered a key contribution to the chapter in question. Subsequently the IPCC has set out in Appendix A of its procedures for the preparation, review, acceptance, adoption, approval and publication of IPCC reports that "the IPCC should make every effort to engage experts from the region on the author teams of chapters addressing specific regions, but should also encourage experts from countries outside of the region where they can provide an essential contribution to the assessment".

6. Do the IPCC reports still have value?

Clearly, any scientific assessment conducted on such a large, global scale that seeks to review, synthesise and assess the breadth of evidence is a complex task. A number of changes following the publication of the IAC report have already been implemented by the IPCC, and further lessons are likely be learned following the publication of AR5.

The IPCC has recognised the need to further enhance and improve its review process and as such invited member countries to submit formal comments on the scope and timescale of its post–AR5 review process, to inform its future structure and work. Following these formal submissions, the IPCC will commence its review of its future development at its 37th session, which will be held in Georgia in October 2013.

Despite the shortcomings identified by the IAC report, the IPCC assessments, written for governments and other policy-makers, remain the most comprehensive reviews available about the physical science basis of climate change.

Key reading and further information:

- Working Group I website: http://www.climatechange2013.org/
- Working Group 1 Q&A: http://www.climatechange2013.org/images/uploads/WG1AR5_Questions.pdf
- IPCC factsheet on how the IPCC details with alleged errors: http://www.climatechange2013.org/images/uploads/FS_ipcc_deals_errors.pdf
- IPCC factsheet on author selection: http://www.climatechange2013.org/images/uploads/FS_select_authors.pdf
- IPCC factsheet on reviewed literature: http://www.ipcc.ch/news_and_events/docs/factsheets/FS_ipcc_assess.pdf
- IPCC introduction to AR5 (leaflet): http://www.ipcc.ch/pdf/press/ipcc_leaflets_2010/ipcc_ar5_leaflet.pdf
- IPCC fact sheet on Working Group I: http://www.climatechange2013.org/images/uploads/WG1AR5_FactSheet.pdf

- IPCC Appendix A to the principles governing IPCC work: http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a-final.pdf

- Summary of the main recommendations made in the IAC report: http://www.ipcc.ch/pdf/IAC_report/IAC_recommendation_summary.pdf

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