INTERGOVERNMENTAL PANEL ON Climate Change

WMO UNEP

IPCC Expert Meeting on Communication

Oslo, Norway
9–10 February 2016

Meeting Report

Edited by:
Jonathan Lynn, Monica Araya, Øyvind Christophersen, Ismail El Gizouli, Susan Joy Hassol, Enrique Maurtua Konstantinidis, Katharine J. Mach, Leo Meyer, Kiyoto Tanabe, Melinda Tignor, Rabelani Tshikalanke, Jean-Pascal van Ypersele

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IPCC Expert Meeting on Communication

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Preface

At its 41st Session, the IPCC Panel requested an Expert Meeting in which participants would share experiences, best practices and lessons learned from communication and outreach around the Fifth Assessment Report (AR5), and on which a report would be prepared for the 43rd Session of the Panel. The meeting was held in Oslo, Norway, on 9 and 10 February 2016, with the generous support of the Government of Norway.

This report summarizes the discussions at the Expert Meeting, which yielded a wealth of recommendations to the IPCC on how it could build on the advances it has already made in communication to ensure that its assessments are clear, accessible, actionable and relevant to all its stakeholders. The Expert Meeting was particularly timely not only because, following the election of a new Bureau, work is now starting on the Sixth Assessment Report, but also because a number of studies of how AR5 was communicated have recently appeared in the academic literature. Many of the recommendations reflect and build on decisions on the future work of the IPCC taken by the Panel at the 41st Session. Others will provide food for thought to the Panel, its members and third parties in their outreach work on the findings of the IPCC.

I would like to thank the Norwegian Environment Agency for hosting the meeting in Oslo, with special thanks to Øyvind Christophersen, who first proposed the meeting, and his colleagues for their tireless support and organization. The meeting would not have taken place without the work of the Steering Committee, who provided expert guidance on planning and implementation as well as preparing this report. Lastly, I would like to thank all the participants for their contributions to two days of rich and stimulating dialogue.

Hoesung Lee
IPCC Chair

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1 Communicating the IPCC – Challenges and Opportunities

Communicating the IPCC – Challenges and Opportunities

The Fifth Assessment Report (AR5) – the IPCC's most recent comprehensive assessment, completed in 2014 – is widely recognized by journalists, communications scientists, governments and civil society organizations to have marked a step change in the way the IPCC communicates its activities.

The communication of AR5 saw both greater professionalism at all stages of the process, and greater breadth and diversity in the subsequent outreach activities.

The results of this can perhaps best be seen in the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) reached at the Conference of the Parties in December 2015 (COP21). That agreement is based on science, specifically the assessments that the IPCC communicated to negotiators through the Structured Expert Dialogue and other activities at UNFCCC meetings, and also to other stakeholders.

And yet the IPCC has faced growing calls from policymakers and other users to do more with its communications. IPCC assessments represent a unique cooperation between the scientific and policy communities. But even the Summary for Policymakers (SPM), the result of an intense dialogue between IPCC authors and government representatives to produce a text that is an accurate summary of the underlying scientific assessment while serving the needs of policymakers, is widely criticized as being unreadable and inaccessible for non-specialists.

Is the answer to simplify the language and visual elements of the SPM to make them more accessible? Can that be done without comprising scientific accuracy? Does the IPCC need additional communications tools? Should the IPCC reconsider how it works with the media and others? What is the role of third parties in communicating IPCC products and how should the IPCC interact with them? How do users of the IPCC work with IPCC reports? How do producers of other assessments deal with these problems?

To answer these and other questions, the IPCC held an Expert Meeting on Communication on 9-10 February 2016 in Oslo, Norway. The Expert Meeting brought together scientists who had worked on and communicated AR5, elected IPCC officials who will guide future assessments, communications experts, and representatives of governments and other users to discuss lessons learned from AR5 and to look to the future.

The Expert Meeting, proposed and hosted by Norway, and chaired by Christian Bjørnæs of CICERO, was particularly timely, as the first results of academic research into the communication of AR5 were appearing, and work was starting on the next series of IPCC products, leading to the Sixth Assessment Report (AR6).

To see how far the IPCC has come in communications, it is worth recalling that with AR5, and the related special reports, the IPCC issued its own press releases for the first time. Press releases for previous assessments had been produced by the IPCC's sponsoring organizations, the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). This was because it was feared that to release a press release that necessarily highlighted some aspects of the SPM would entail a breach of the IPCC's policy-neutrality.

Some enhancements to IPCC communications came not from the communications team but from the authors themselves, for instance the use of headlines statements in the Working Group I contribution to AR5 and the Synthesis Report.

Other improvements for AR5 included:

- Responding to media questions before finalization of the reports;
- Media workshops to explain the workings of the IPCC and how it produces assessments;
- Making IPCC communications more professional by working with outside communications experts;
- Making the SPM and press releases available to media under embargo before the press conference;
- Country briefings for different regions at the time of the release of the report;
- Media training for Bureau members and authors;
- Systematic planning of interviews with a range of authors, both face to face and remotely;

- Arranging facilities for broadcasters;
- Production of scientifically rigorous but compelling videos, overseen by the working group co-chairs and IPCC Chair;
- Ambitious programme of outreach activities all over the world;
- Cooperation with third parties producing versions of the report ("derivative products") targeting specific sectors in specific regions;
- Use of social media to publicize IPCC findings and outreach activities.

This gives the IPCC a strong foundation to build on for its future communications work. But there is much more it can and should do.

The two days of talks in Oslo yielded a rich seam of ideas for the IPCC. At one point, one of the participants noted that while some of the ideas under discussion were radical, others were simply "comms 101", and hardly rocket science. But the IPCC is not like other organizations, and does not enjoy the same freedoms that they do. In further developing its communications, the IPCC must recognize both the general challenges to scientific communication and the specific constraints that it faces. After all, the value of the IPCC's work depends on its credibility; the greatest care must be taken not to erode that. While communication theory and psychology point to more effective ways to transmit information, it must be accepted that some of the science that the IPCC deals with is complex: it is important to simplify as much as possible, without oversimplifying. Particular challenges exist around the treatment of uncertainty. While fundamental to science, the language with which uncertainty is communicated to policymakers and the public can result in misunderstandings. And it is important to heed calls for clearer, more direct messages, while remaining policy-neutral. The particular strength of an IPCC assessment derived from a dialogue between scientists and policymakers is enshrined in the approved text of an SPM; communications materials cannot deviate from that.

The Expert Meeting heard from authors of AR5 how they communicated the assessment, and what worked most effectively. Representatives of developed and developing country governments and civil society organizations presented their experiences of outreach activities around AR5. A research study on the communication of AR5, particularly in the UK, was examined, and the communication of the United States National Climate Assessment was presented as a comparison. The question of how misinformation can affect understanding of IPCC reports was discussed. And the importance of informing communication activities from the outset with an understanding of different stakeholders' needs and priorities, rather than bolting it on at the end and transmitting it in a one-way process, was analysed. Besides these plenary discussions, participants worked in breakout groups looking at readability, clarity and policy-relevance; derivative products; working with stakeholders and outreach; and working with the media, in order to draft recommendations. A total of 25 advance papers were submitted ahead of the discussions, and can be found in Annex 4 of this report.

The detailed recommendations can be found in Section 5 of this report. Besides reaffirming the good practices of AR5, a main conclusion was that thinking about communications – including engaging with stakeholders – should start right at the beginning of work on a report. The Expert Meeting also recommended that communications specialists such as science writers and graphics designers should be brought into the work of producing a report early on, in line with a recent decision by the IPCC. It encouraged the IPCC to keep the SPMs clear and concise. Participants emphasized that the media landscape and media technology are changing rapidly, and that the IPCC must be ready to embrace these changes as new reports are released in the coming years. And the Expert Meeting recognized that there are limits to the communications activities that the IPCC can and should undertake; it should define how it will work with third parties to amplify the communication of its reports.

The recommendations contained in this report provide a communications resource to the IPCC's working groups as they start work on AR6, scoping the outline of the reports and selecting authors. Some recommendations that affect work at the start of a report – on scoping meetings, the shape of the SPM, and the use of specialists – have been presented to the 43rd Session of the Panel, on 11-13 April 2016, for decision. Further recommendations will be taken up in a revision of the IPCC's Communications Strategy and its Implementation Plan, for which the help of Pauline Midgley is gratefully acknowledged.

2 Plenary Session Discussion Summaries

Plenary Session Discussion Summaries

The Expert Meeting included a series of presentations each morning, followed by question and answer exchanges, intended to frame the discussions in the breakout groups on recommendations for the IPCC. These sessions are summarized here, and Advance Papers submitted by presenters are provided in Annex 4.

The Plenary Sessions on the first morning (9 February) put IPCC communications into context by setting out the constraints faced by the IPCC in communicating its findings and its work and the demands being put to it; hearing from authors and former co-chairs about how they developed the Fifth Assessment Report (AR5), and the challenges they faced in writing and communicating it; hearing from representatives of governments and civil society about their experience in organizing outreach around the AR5; a report on a major study in how the media communicated AR5; and a discussion of how other organizations communicate climate assessments.

The Plenary Sessions on the second morning examined thematic topics: the challenge for those communicating IPCC findings when faced by misinformation and misconceptions; and an examination of a broader conception of communication based on engaging with the values of the stakeholders being addressed rather than viewing communication as a top-down exercise simply transferring information about a completed body of work.

The summaries below cover substantive Plenary Sessions. Breakout groups, reports from the breakout groups, the world café discussion, etc., are not included. For the full programme, see Annex 2. The Plenary Sessions were webcast, and recordings can be found at: https://www.youtube.com/playlist?list=PL8HWK0G9m3B6T8SN_B1H4h6rhVlAjEFt4

Session 1: Formal opening

Audun Rosland, director of the climate department at the Norwegian Environment Agency, emphasized the importance of the IPCC's assessments for policy-making, and its contribution to the Paris Agreement. The challenge is for the IPCC to communicate its findings to policymakers and other stakeholders so that they can be understood.

Hoesung Lee, IPCC Chair, noted that IPCC assessments are considered the gold standard of climate science, but asked what use they are if many intended users cannot understand them, do not know where to find what they need, or cannot use them in their own work. The IPCC has greatly enhanced its communications activities, but hears repeatedly from policymakers – the IPCC's principal audience – that they cannot easily use IPCC reports in their own work. The IPCC wants to make its reports more readable, and its products more relevant to its users. At the same time it must secure the scientific rigour, policy neutrality, accuracy and balance on which the gold standard is based. The Panel has called for further improvements to IPCC communications, by making greater use of digital technology to improve access and readability and drawing on the help of experts in different communications disciplines. The aim is greater accessibility, but also actionability, for which the IPCC needs to interact more effectively with its users through more sophisticated outreach, while understanding and speaking to their needs.

Session 2: IPCC communication issues – constraints and opportunities

Jonathan Lynn, Head of Communications at the IPCC, recalled that there are practical limits on what the IPCC can say and how it says it. Credibility is fundamental to the IPCC's work and anything that undermines that credibility would undermine the value of the IPCC. It must be recognized that at times the science discussed by the IPCC is complicated, and oversimplifying or distorting it is not the answer. The call for simple clear messages can easily morph into advocacy, and the IPCC must remain vigilant: it is not a campaigning organization. The IPCC's structure and procedures may pose communications problems. From a communications perspective it is better to present solutions at the same time as problems. But the IPCC has confirmed it will continue to issue its assessments as three separate working group contributions followed by a synthesis, and this practice is not open to discussion as part of improved communications.

The last few years have seen much progress. The IPCC introduced is own press releases in the AR5 cycle, produced compelling but scientifically accurate videos, and developed headline statements as a communication tool. Although the IPCC is conservative and cautious, change is possible when it is seen to work.

Now policymakers are saying they want the IPCC to make it easier for them to work with IPCC material. That means addressing local concerns when assessing a global phenomenon, and providing more information about the economic and social consequences of climate change – the costs and benefits of action and inaction. It means a more effective treatment of uncertainty, which can lead to policy paralysis but which is intrinsic to scientific reporting. It means a clear understanding of how and when the IPCC can move beyond the approved language of a Summary for Policymakers (SPM), for instance as was done in the Structured Expert Dialogue with the United Nations Framework Convention on Climate Change (UNFCCC). It also requires the IPCC to consider to what extent, and how, it should interact with third parties that communicate IPCC findings, to help them make their materials an accurate reflection of what the IPCC said. It involves awareness that different audiences have different needs in terms of language and thematic content. And it means understanding that communication is not something bolted on at the end of a report when the scientists have finished their work, but something developed organically with the assessment from the beginning.

In the discussion, IPCC Vice-Chair **Youba Sokona** noted that the frequent reference to working groups by number (Working Group I, II or III) is itself a barrier to communication. Working Group II Vice-Chair **Andreas Fischlin** asked for more detail about the policymakers that had been complaining about the difficulty of understanding IPCC assessments. **Jonathan Lynn** said it was striking how often this had come up in official contacts and outreach activities over the past year. Working Group III Co-Chair **Jim Skea** said that even some SPM texts were impossible to understand and gave an example. The use of uncertainty language is particularly challenging.

Nick Nuttall, of the UNFCCC, said that the communication effort around AR5 had been a real advance on what had gone before, benefiting from the contribution of many people. More can be done, especially following the Paris Agreement, with implementation providing a general context for the IPCC's next reports. He agreed that there is a need to improve the communication of risk and uncertainty, and that the agreed IPCC language can still act as stumbling block to comprehension. Communicators must be aware of the rapidly changing media and technology landscape as they prepare for reports to be issued in several years' time. He called for inclusion of studies of human psychology and behaviour in the next assessment.

Joyashree Roy, a coordinating lead author for Working Group III, recalled the actionable sector-specific summaries produced by Working Group III for the Fourth Assessment Report (AR4). These were translated into many languages and widely used by non-governmental organizations (NGOs). There is also scope to communicate individual chapters or their summaries. IPCC communications activities must go beyond policymakers in the narrow sense to address other decision-makers, e.g. multilateral funding agencies. A similar point was made by **Jessica Dator-Bercilla**, of Christian Aid/Manila Observatory, who noted that the line of responsibility for responding to climate change in the Philippines was at the village leadership level. **Jonathan Lynn** confirmed that the IPCC understands policymakers to refer to all levels of government and administration and a wide range of decision-makers.

Session 3: The AR5 experience – communications lessons from the authors

Chris Field, former Co-Chair, Working Group II (AR5), said that on the evidence of the Paris Agreement reached a couple of months earlier, the IPCC had communicated the science successfully. The agreement was science-centred, got the science right, and focused on issues raised by the IPCC. The essence and value of an IPCC report is the shared ownership by the scientific and policymaking communities arising from approval of the SPM in plenary. There are sometimes trade-offs between understandability and shared ownership, and sometimes statements come out less clearly than they should. This comes down to the need for author teams to understand questions raised by governments and finding the right words: it is a challenge of flexibility and creativity for the author teams. Figures offer a tremendous opportunity to use graphical elements to communicate more effectively; there were good and less good examples in AR5. It is important to invest in training the author teams so that they are effective in the approval plenary.

It is important to recognize the IPCC's successes in communications while being cautious about what is appropriate. So the IPCC should focus on where it can add most value rather than trying to do everything. Through shared ownership the IPCC adds unique value, which should be used as a base to expand a set of messages contributing to climate science communications from many sources and amplified by many stakeholders. It is important to see communication as a process not a product. For instance in AR5 the IPCC made it clear it wanted a conversation and constructive engagement with media.

Leo Meyer, former head of the Synthesis Report Technical Support Unit (TSU) (AR5), noted that the mandate of the Synthesis Report is to provide non-technical information suitable for policymakers. But the text is full of technical jargon, as it is based on the three working group contributions. Efforts to distill findings into headline statements can be challenging especially for Working Group II or III material, where the result may be bland truisms saying nothing.

SPM 4.4 Policy approaches for adaptation and mitigation, technology and finance

Effective adaptation and mitigation responses will depend on policies and measures across multiple scales: international, regional, national and sub-national. Policies across all scales supporting technology development, diffusion and transfer, as well as finance for responses to climate change, can complement and enhance the effectiveness of policies that directly promote adaptation and mitigation. *(4.4)*

Headline statements from these areas should not try to summarize everything in one sentence but focus on something new conveying a key message to policymakers. Author teams should make use of science writers or journalists, brought in early, to help with this.

Graphics can sometimes be difficult to understand, as page restrictions tempt authors to cram too much information into a graphic. The lengthy caption in this example from the Synthesis Report indicates an effort to do too much.

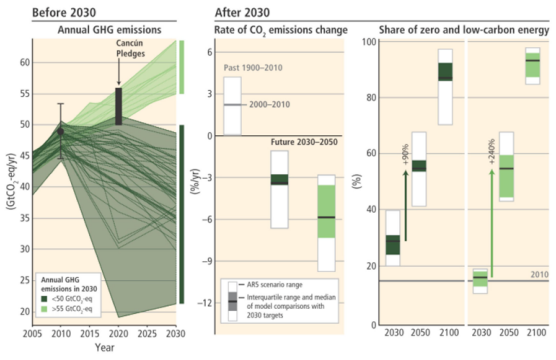
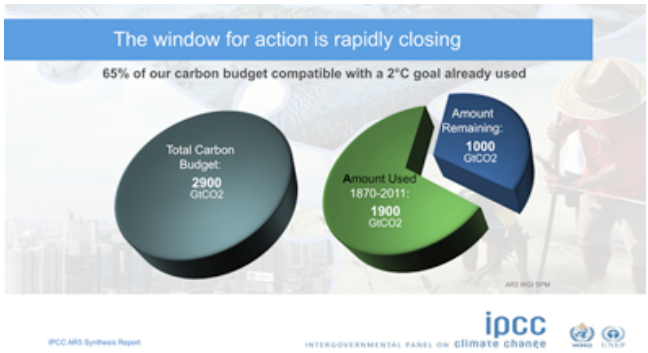


Figure SPM.12 | The implications of different 2030 greenhouse gas (GHG) emissions levels for the rate of carbon dioxide (CO_2) emissions reductions and low-carbon energy upscaling in mitigation scenarios that are at least *about as likely as not* to keep warming throughout the 21st century below 2°C relative to pre-industrial levels (2100 CO_2-equivalent concentrations of 430 to 530 ppm). The scenarios are grouped according to different emissions levels by 2030 (coloured in different shades of green). The left panel shows the pathways of GHG emissions (gigatonne of CO_2-equivalent per year, $GtCO_2$-eq/yr) leading to these 2030 levels. The black dot with whiskers gives historic GHG emission levels and associated uncertainties in 2010 as reported in Figure SPM.2. The black bar shows the estimated uncertainty range of GHG emissions implied by the Cancún Pledges. The middle panel denotes the average annual CO_2 emissions reduction rates for the period 2030–2050. It compares the median and interquartile range across scenarios from recent inter-model comparisons with explicit 2030 interim goals to the range of scenarios in the Scenario Database for WGIII AR5. Annual rates of historical emissions change (sustained over a period of 20 years) and the average annual CO_2 emission change between 2000 and 2010 are shown as well. The arrows in the right panel show the magnitude of zero and low-carbon energy supply upscaling from 2030 to 2050 subject to different 2030 GHG emissions levels. Zero- and low-carbon energy supply includes renewables, nuclear energy and fossil energy with carbon dioxide capture and storage (CCS) or bioenergy with CCS (BECCS). [Note: Only scenarios that apply the full, unconstrained mitigation technology portfolio of the underlying models (default technology assumption) are shown. Scenarios with large net negative global emissions (>20 $GtCO_2$-eq/yr), scenarios with exogenous carbon price assumptions and scenarios with 2010 emissions significantly outside the historical range are excluded.] *[Figure 3.3]*

It communicates information well to scientists in the same field, but not to non-specialists. By contrast a slide from the generic Synthesis Report presentation, not part of the report but based on it, works well, with a few simple elements and short title.



Pauline Midgley, former head of the Working Group I TSU (AR5), also noted the constraints of approved language and the challenges of communicating uncertainty. She noted that there has been a huge turnaround in communications during the AR5 cycle. Even before the Panel developed a communications strategy, Working Group I started to develop communications elements in its work plan. For instance it held media briefings at each Lead Author Meeting, not discussing the content of the report but explaining how the IPCC works. Communications and outreach activity must be integrated into the process at a level that can be sustained, bearing in mind that authors are not paid by the IPCC for their work and need to know what is expected of them from the start. Attention was paid to the narrative of the Working Group I SPM from the early stages of its development and this led naturally to the Working Group I headline statements, which were discussed intensively among authors. These headline statements are approved language as part of the SPM approval process, and therefore much stronger than a derivative product that is developed after finalization of the report. Frequently Asked Questions (FAQs), introduced by Working Group I in AR4, benefited from the contribution of a professional science writer from early on in the development of the Working Group I AR5 contribution.

Youba Sokona, who was also former Co-Chair, Working Group III (AR5), recalled the image used by Working Group III of the IPCC acting as a mapmaker for policymakers as navigators. If the map is not clear then the navigators cannot navigate. Working Group III also put effort into internal communications, ensuring that authors agreed on the same concepts and terms, and working to put complex problems into simple language. A wide range of authors is needed to capture the different elements of the subject and graphics must be produced professionally. Outreach activities must be adapted to local conditions and working groups can help outside institutions communicate IPCC findings through derivative products.

Lindsey Fielder Cook, of the Quaker United Nations Office, asked how the IPCC could communicate the sense of urgency needed to implement the Paris Agreement, while remaining within its mandate, especially as it would be some years before a new report is available. **Pauline Midgley** said that AR5 remained available as a resource to discuss the implications of the Paris Agreement and preparations for the Sixth Assessment Report (AR6). **Chris Field** added that former IPCC authors could also refer to research produced since AR5 and based on it, but this needed careful handling.

Stuart Neil, of the World Energy Council, noted that different stakeholders, such as energy ministers, energy companies, and the financial sector, needed to be addressed in different ways as their needs were often different and they used different language to explain similar concepts. **Youba Sokona** noted that IPCC scientists are in a dialogue with policymakers both at the outset of a report – the scoping process – and at the end with the approval of the SPM. But the IPCC does not select the government representatives who may be drawn from a wide range of policymakers at all levels.

Gabriel Blanco, a coordinating lead author of Working Group III, said it was important to link the IPCC's findings on climate change to individuals' social and political choices, and how such choices affect decision-making at all levels. It is important to bring social scientists and anthropologists into the author team for this. Authors must look carefully at the treatment of uncertainty, as it can be used to undermine scientific findings. The IPCC should work with journalists from early on in the development of a report to give them a sense of ownership and help them understand how the IPCC

works. It should also work with artists and filmmakers. Graphic designers should not only be employed to produce figures to order but treated as source of expertise on how to communicate findings.

Tim Nuthall, of the European Climate Foundation, recalled how communicators and scientists had gradually built trust and understanding at various points over the AR5 cycle, including the launch of the special reports. This meeting represents an opportunity to supercharge that relationship. It is important to understand the boundaries between the work of the IPCC and what others can do. **Chris Field** said these contacts had enabled the IPCC to develop ambitious outreach products such as videos and websites.

Joyashree Roy, emphasized the importance of elements such as the technical summary, executive summaries of chapters, FAQs, knowledge gaps and headline statements as communications tools. It was important for authors to start work on headline statements from the beginning of the report, which had not been the case for all working groups in AR5. **Leo Meyer** said it was important that authors understood the full range of tasks they would handle from the beginning of their engagement.

Session 4: The AR5 experience – lessons from outreach

Øyvind Christophersen, Norwegian focal point and Norwegian Environment Agency, outlined how Norway had communicated AR5.

Even before the report was completed, Norway worked hard on readability at the review stage through comments. The sequencing or structure of a report or presentation is important for effective communication. Start with the key findings, then provide background and what can be done. Many scientists take the reverse approach: starting with methodology, then listing what they have achieved and finishing with key findings. Besides starting with key findings it is important to focus on what is relevant and useful for readers and decision-makers. Given the challenges of rendering complex material clearly, it is important to focus on the most relevant material. That means in turn a focus on solutions as well as problems. Complex graphics can be effective in a report where the reader has time to study and decipher them, but for a presentation where they are projected for a short time only, a different, simpler format is needed. Photos should also be used.

For Norway it was essential to pick out the locally relevant material and translate it into Norwegian. That requires early access to materials. Local media too need the information in a timely manner, so local Norwegian launches of the report are timed to coincide with the IPCC's global launch.

Discussing solutions is more complicated in terms of language than stating the evidence for climate change. Thought should be given now as to how to communicate this in AR6.

Hunter Cutting, of Climate Nexus, recalled that NGOs had mounted a large communication effort – press conferences, previews, etc. – around AR4 as the IPCC had not done so. The IPCC's own communication effort for AR5 marked a great advance, especially in outreach, and this should continue in AR6. Using professional science writers will help develop a clearer text. In addition it is important to understand while preparing the text that a report reaches most policymakers through a filter of the media, and to understand the policy context in which policymakers are working. The treatment of the warming hiatus in AR5 is an example. The IPCC did not engage with media on this topic during the development of the report. Language changed significantly between the final government draft and the approved SPM – a case of governments adding clarity. But this was too late for many reporters to understand the detail and context; indeed this question continues to be discussed in the media. The IPCC's treatment in the report was technically correct but it lost an opportunity to provide guidance to media earlier on. Many reporters seized on the mention of the hiatus as

something new in the report. The use of the term uncertainty is often understood to mean doubt, and authors should find more accessible ways to discuss the concept, including using the language of risk.

Jessica Dator-Bercilla said that the series of climate-related disasters that have hit the Philippines since 2004 prompted questions from communities that led humanitarian NGOs to approach scientists for answers. This resulted in the creation of interdisciplinary platforms bringing together scientists, including IPCC authors, community members and policymakers at the local and national level. The focus was on discussion, drawing on AR4, AR5 and the Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX), rather than the production of materials such as posters or animations. This enabled participants to develop evidence-based advocacy, drawing on combinations of community leaders and scientists, resulting in new legislation on disaster risk management, and funding for adaptation. Stakeholders in the Philippines also used data from AR5 to promote climate resilience in Asia-Pacific Economic Cooperation (APEC) and the inclusion of resilience and risk management in the Climate Vulnerable Forum.

Christiane Textor, of the German IPCC Coordination Office, said that official German outreach concentrates on explaining the IPCC to bolster its credibility. The government facilitates outreach about the findings rather than doing it itself, and supports German scientists attending meetings. Communication in German is essential, and based on IPCC materials, although it can be challenging to condense thousands of pages of IPCC reports into short, but accurate documents. IPCC reports are not easy to navigate and so the German IPCC Coordination Office shows people where to find information – the right report, and the right place in the report. It also organizes annual meetings facilitating the science-policy dialogue between climate researchers and representatives from ministries, government agencies, NGOs and business. These have the added benefit of showing that IPCC reports are produced by living people not an anonymous UN body. A massive open online course (MOOC) developed by the German Climate Consortium and WWF based on the findings of AR5 shows how third parties can conduct outreach effectively.

Rabelani Tshikalanke, of South Africa's Department of Environmental Affairs, described the outreach event held in South Africa in November 2014 with the help of CDKN. This regional event drew participants from all over Africa, and had extra impact locally by coinciding with South Africa's National Climate Change Response Dialogue. The event started with a media workshop, which not only familiarized regional media with the work of the IPCC, but also included discussions on climate-related story ideas that reporters could develop. A session for local scientists sought to encourage the local research community both to close local knowledge gaps, e.g. on drought, and to work with the IPCC. Many stakeholders in the region have little awareness of the IPCC, while IPCC findings are often not downscaled to the local level and therefore not relevant to policymakers. A science-policy dialogue discussed how to promote the interface between the two communities and simplify IPCC messages for local policymakers. The main results included the need to downscale findings to a local or city level where policymakers can take decisions; the need to provide simple information in local languages; and the need to increase the contribution of African scientists to the work of the IPCC. Using African authors in IPCC outreach now sets a good example to young scientists in terms of encouraging them to work with the IPCC.

Simbisai Zhanje, of CDKN, discussed the three national outreach events organized by CDKN in Africa in 2014. These took place in Kenya, Ethiopia and Uganda. As with the regional African event described above, these had three layers: a science-policy dialogue between stakeholders and IPCC authors; a meeting for young scientists to encourage them to publish their research and to work for the IPCC as reviewers or authors; and a media workshop. The events demonstrated a huge demand for information at the regional, sub-regional and country level, not only among policymakers but also the private sector and civil society. Without a clearer understanding of the impacts of climate change at different levels it is hard to move from business as usual. Different stakeholders need different information in different formats, e.g. policy briefs for ministers and more detail for technocrats, while different ministries also have varying focuses. The use of African IPCC authors helped provide country context including local development priorities. For the research community it is important to demonstrate that climate change is an interdisciplinary topic not just an environmental concern, and greater contact between IPCC focal points and the research community is needed to increase local scientific involvement with the IPCC. More training for reporters and editors is needed so that media

provide continuous coverage of climate change rather than only when there is a disaster. In some countries social media has only limited reach and community radio is more effective for reaching the broad population.

Imelda Albaño, of Philippines EnviroNews, said it was important to include the human dimension of climate change into future reports to help change people's perceptions. **Debra Roberts**, Co-Chair of Working Group II, agreed that different levels of policymaker require different types of information. In some countries even headline statements will be too complex at the village level. **Christiane Textor** said governments can involve all levels of policymaker in the review process.

Laura Gallardo, University of Chile, said it is important to focus on cities as that is where the majority of people live and where most action to tackle climate change will take place. In discussing the use of science writers, it is important to consider languages other than English and remember that storytelling can change with culture and language. **Øyvind Christophersen** said complex language in the original report could make it difficult to translate clearly.

Session 6: The JPI Study on Communicating AR5 and
Session 7: Climate Communications – Other Assessments

James Painter, of the Reuters Institute for the Study of Journalism, reported on the JPI Study on communicating AR5, part of the Joint Programming Initiative AR5 in Europe project, coordinated by CICERO and funded by the Norwegian Research Council (See Advance Papers for the full report). The study looks at how science gets into policymaking, examines the role of focal points, and examines media coverage of AR5. One conclusion is that it is important to test communications approaches and materials on users in advance, to understand how they use them. There is little academic work on how the IPCC is used by policymakers and what information there is tends to be anecdotal, with huge gaps about users' needs and what they would find useful in communication. The study surveyed around 30 mainly UK users from 4-5 user groups taken from the IPCC Communications Strategy: local UK politicians and councillors; CDKN, the UK Foreign Office; business; NGOs; higher education; and media representing the wider public. All those interviewed already used IPCC reports and were interested in them. They were asked three questions: How do you use the report? What do you think about the language and clarity? What recommendations do you have? Of the 10 findings, four are discussed here.

1. All those surveyed found the headline statements from Working Group I very helpful. There is some academic analysis showing that headline statement text made its way into print media.
2. The business community knew about the derivative products produced by the Cambridge Institute for Sustainability Leadership and CDKN, and found them very useful. But there were some questions on how such reports should be made available in different languages, and how they could use risk language that is understood.
3. Most of those surveyed (80-90%) thought that the use of specialist writers, brought in early, was a good idea. There were questions about who was meant – journalists, scientists who can write, science communicators – and there should be guarantees that the scientists and not the writers have the final say. Graphic designers should also be brought in this way.
4. Communications activities must reflect the revolution underway in new media and how information is consumed. There are huge and rapid changes, for instance in the growing use of video on social media. It is impractical to expect IPCC authors to be on top of this but there are experts who can be tapped. This is not only a first-world issue.

Responding, **Laura Gallardo** raised the question of what is meant by policymakers. IPCC approval processes involve representatives of national governments, but there are other levels of policymaking: for instance COP21 brought together mayors from around the world. To what extent can this UK-centric study be extrapolated to the rest of the world? Different cultures must be reflected in communications work (including the IPCC's own communications team).

Susan Joy Hassol, of Climate Communication, presented the communication of the 2014 U.S. National Climate Assessment (NCA, also NCA3). Work on this assessment incorporated communication from the very beginning.

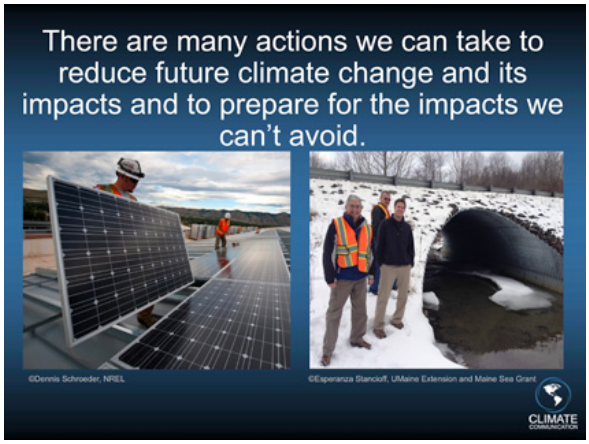
A strong editorial team was brought together that was experienced in explaining complex matters simply, and presenting and synthesizing large bodies of complex information. The NCA used professional photographs and graphic designers, listening to their advice and testing information on them. The communication team worked with the scientists in an integrated and iterative manner, in contrast to the traditional sequential approach of producing the science and then handing it over to the editors. In these interactions the scientists always had the final say, but this never became a point of contention because the team worked together for the best outcome.

The NCA made use of simple clear language and strong photos.

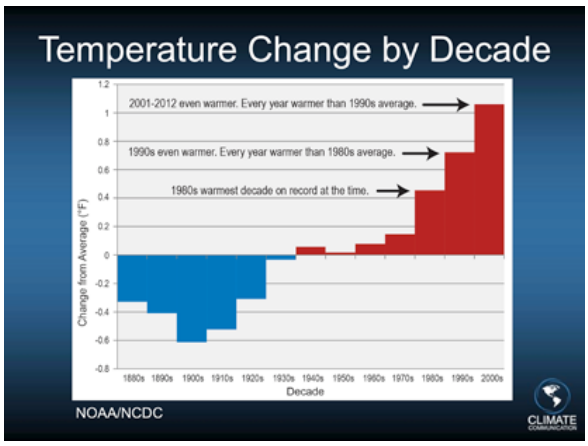
The science of science communication informed the choice of photos: photos showed people to make them relevant and easier for people to connect with.

Such photos depicted both the impacts of climate change as experienced by real people --

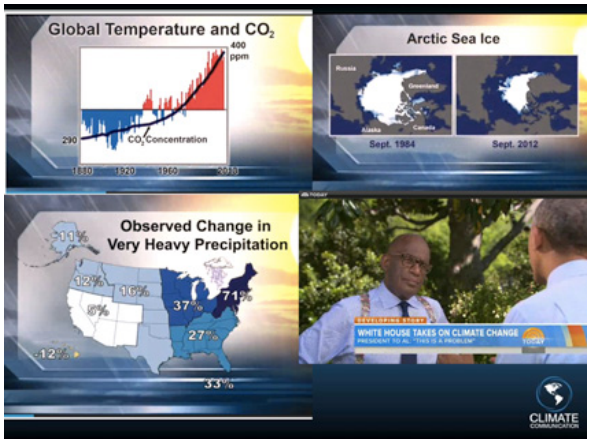
-- and possible solutions. They show people taking action, and they tell stories of people dealing with climate change.



The NCA also used simplified graphics that could be understood by non-specialists rather than those used in specialist journals.



Some graphics were further simplified and prepared for broadcasters and other media, so that a package of broadcast-ready visuals was available to media as the report was being launched.



The editors and scientists also paid careful attention to the way the findings of the different chapters were synthesized.

Rather than having one key message per chapter and pasting that into a synthesis document, authors stepped back to consider the major, overarching, cross-cutting themes of the assessment. Each of the 30 chapters had its own key messages, and drawing on these the authors developed 12 report findings for a Highlights document, which is a synthesis rather than a summary.

Authors provided traceability for these findings through chapter icons at the bottom of the page.

A section on "Concluding Thoughts" uses photos to help tell stories. Scientists uncomfortable with the notion of "stories" may wish to call them case studies.

All the authors received communications training both for media and on giving effective presentations, and slides for presentations were provided with advice on how to use them. A series of webinars were held so that all authors could participate, and those authors who would work most with the media received intensive media training in person.

The report's findings and key messages were distilled further into three simple messages, and authors practised various ways of delivering these, reflecting the principle that effective communication depends on simple clear messages repeated often by a variety of trusted sources.

The resulting headlines show that the NCA team got its message across.

The authors also considered how best to deal with uncertainty language. Some authors (as well as the public) had trouble with the dual concepts of confidence and likelihood as applied by the IPCC, and there were concerns about keeping the use of language consistent. The agreed-upon solution was to include in each chapter a section of supporting evidence, which included an assessment of confidence and an explanation of the language used for confidence levels, as well as descriptions of the process used by authors to develop key messages, the evidence base, and remaining uncertainties. Thus this information is available to those users who want it, but is not in the body of the main text where it could disrupt the flow of the chapter for other users.

Communication of the assessment was greatly enhanced by setting up a network of networks (NCAnet) involving 170 organizations which were kept informed throughout the process and could help deliver findings to their members.

Adam Corner, of Climate Outreach, said the NCA showed it was possible to communicate an assessment in an evidence-based way. For instance there is growing evidence that visual communications should be used, and not to use them runs counter arguably to the philosophy of the IPCC. The question arises as to how that evidence base should be incorporated. **Øyvind Christophersen** recalled that SREX too had used case studies. They are a way to build bridges between hard science and the stories that need to be told. The challenge is picking the right case studies and summarizing them.

Nick Nuttall said communication of the NCA had benefited from strong government support. It would be good if governments could be persuaded to get messages out in their own countries in a similar way in the run-up to AR6. The intensive communication around the report meant no one could be ignorant of it. But how much did it cost? **Leo Meyer** asked whether the assessment and its communication had affected the position of naysayers.

Susan Joy Hassol said there is a science of science communication and we should use it. Everything done with the NCA was based on science. For example, there is evidence that case studies or storytelling work. In summarizing findings there is a danger that they become abstract and general and thus do not touch people. It is necessary for the team to work iteratively with stories in order to choose the best case studies. There were costs in communicating the NCA in this way, for instance using professional photographs as well as graphic design and editorial experts. The NCA had an effect, for instance in demonstrating that climate change is happening now and is not just a problem for the future; the report is still being cited.

James Painter asked how much of the experience of the NCA in the United States could be transferred to the IPCC. The NCA is a great product but with very different processes. The Reuters Institute for the Study of Journalism has done some work recently on how the media uses uncertainty language. The uncertainty framing of articles on IPCC findings dropped sharply between AR4 and AR5.

Heidi Cullen asked whether the NCA had defined metrics of success in advance. **Susan Joy Hassol** said this was looked at afterwards, particularly in terms of media coverage and website visits, both of which were impressive. More

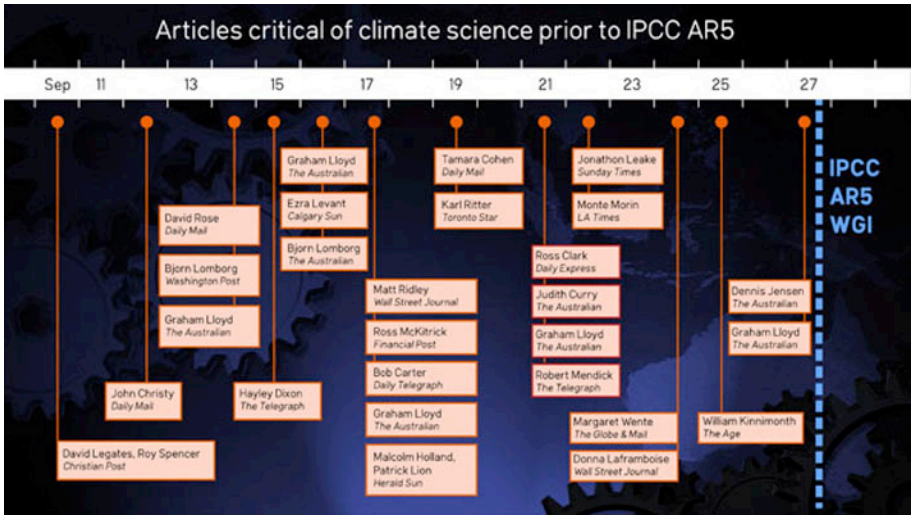
than 2000 news stories appeared within a week of the report's release, and media mentions have continued steadily, with more than 5000 stories citing NCA3 by October 2015, often 5 to 10 per week. Within the first year of its release, the full report was downloaded more than 850,000 times. One objective that was stated by the team in advance was to greatly expand the number of organizations engaged with the assessment; a social network analysis by an outside team of researchers showed that that objective was met. **James Painter** said there were established metrics for communication and they should be used.

Surveyor Efik, of the Climate Change Network Nigeria, said NGOs in Nigeria had had to get the scientific community there to simplify the language of AR5 and put it into the local development context before they were able to communicate with policymakers and the media. **Richard Black**, of the Energy and Climate Intelligence Unit, said the NCA had taken some very innovative approaches but much of what was described is Communication 101. Why can't the IPCC just do this? **Lance Ignon**, of the IPCC Secretariat, said much of the discussion so far had been about the printed word, but, as the NCA release had shown, there had to be a greater emphasis on speaking and presentation. **Beth Holland**, of the University of the South Pacific, said that the key to successful communication is an inclusive approach yielding shared ownership. What are the key recommendations for this besides involving more authors from developing countries? **Tim Nuthall** applauded the NCA's decision to embed communication from the beginning. He urged the IPCC to sit down with the NCA team and work out what is transferable, including looking at NCAnet. **Andreas Fischlin** asked about the ratio of scientists to communications experts on the NCA.

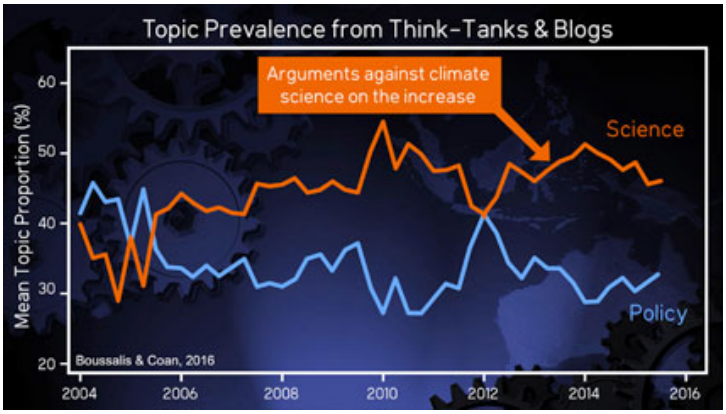
Susan Joy Hassol said the key to inclusivity was involving stakeholders from the beginning and keeping them informed and involved throughout. NCAnet was set up at the start of the NCA process and reached deeply into a wide range of stakeholder networks. There was an open process with anyone able to submit documents for review by the author teams as input to the assessment. With regard to the ratio of communications experts to scientists, there were four official editors on the NCA compared with hundreds of scientists, but the editing team tried to participate in the initial author team meetings to provide input from the start. The broader communications team at the Technical Support Unit was made up of about a dozen people, divided about evenly between editorial, graphics, and web experts. A web design contractor was also brought in to supplement the web experts on staff. **James Painter** said a strong recommendation was to involve the business sector, and individual sectors such as finance, in the scoping process, particularly with a view to understanding what kind of language business uses. **Laura Gallardo** said understanding of stakeholders was important: users must be able to see their reality reflected in the report.

Session 15: Tackling misinformation and misconceptions

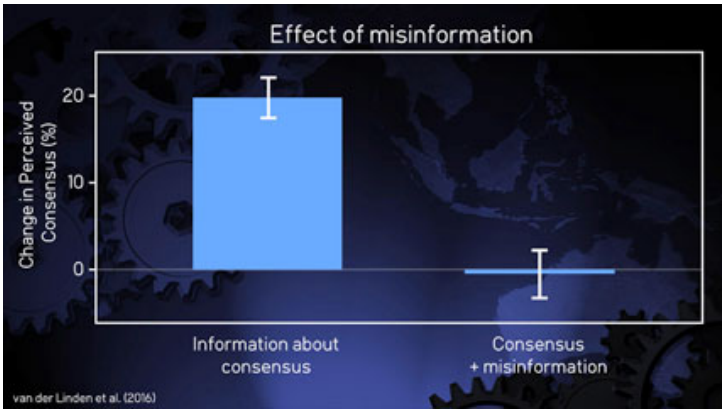
John Cook, of the University of Queensland, discussed the science of science communication, in particular the psychological research into misinformation and how to address misconceptions. The IPCC is very influential and therefore there are attempts to undermine what it says. There was a surge of articles (27 in 17 days) in the mainstream media challenging climate science in the run-up to the release of the Working Group I report in September 2013 – before the report was even out.



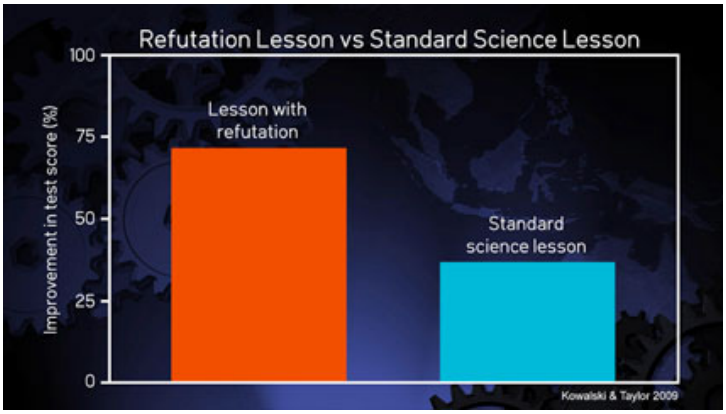
Since then analysis of the content of articles in blogs and publications critical of climate science and policy shows that articles about science continue to predominate over policy, contrary to expectations that the reverse would happen as confidence in the scientific fundamentals grows.



What should be the response of the IPCC? Should it just communicate the science or address the misinformation and misconceptions? Studies show that misinformation affects and undermines the perception of science. Only a few pieces of misinformation can have an effect.



On the other hand, there is an educational opportunity. Research shows that lessons are more effective when combined with refuting related misconceptions.



However, addressing misconceptions carries risks, as it can reinforce them. The way AR5 addressed the topic of the apparent hiatus in rising temperatures – adopting that language – or raising the question of solar influence on climate change, may have confirmed these ideas in the minds of some readers.

Box 9.2 | Climate Models and the Hiatus in Global Mean Surface Warming of the Past 15 Years

The observed global mean surface temperature (GMST) has shown a much smaller increasing linear trend over the past 15 years than over the past 30 to 60 years (Section 2.4.3, Figure 2.20, Table 2.7; Figure 9.8; Box 9.2 Figure 1a, c). Depending on the observational data set, the GMST trend over 1998–2012 is estimated to be around one-third to one-half of the trend over 1951–2012 (Section 2.4.3, Table 2.7; Box 9.2 Figure 1a, c). For example, in HadCRUT4 the trend is 0.04°C per decade over 1998–2012, compared to 0.11°C per decade over 1951–2012. The reduction in observed GMST trend is most marked in Northern Hemisphere winter (Section 2.4.3; Cohen et al., 2012). Even with this "hiatus" in GMST trend, the decade of the 2000s has been the warmest in the instrumental record of GMST (Section 2.4.3, Figure 2.19). Nevertheless, the occurrence of the hiatus in GMST trend during the past 15 years raises the two related questions of what has caused it and whether climate models are able to reproduce it.

Figure 9.8 demonstrates that 15-year-long hiatus periods are common in both the observed and CMIP5 historical GMST time series (see also Section 2.4.3, Figure 2.20; Easterling and Wehner, 2009; Liebmann et al., 2010). However, an analysis of the full suite of CMIP5 historical simulations (augmented for the period 2006–2012 by RCP4.5 simulations, Section 9.3.2) reveals that 111 out of 114 realizations show a GMST trend over 1998–2012 that is higher than the entire HadCRUT4 trend ensemble (Box 9.2 Figure 1a; CMIP5 ensemble mean trend is 0.21°C per decade). This difference between simulated and observed trends could be caused by some combination of (a) internal climate variability, (b) missing or incorrect radiative forcing and (c) model response error. These potential sources of the difference, which are not mutually exclusive, are assessed below, as is the cause of the observed GMST trend hiatus.

Internal Climate Variability

Hiatus periods of 10 to 15 years can arise as a manifestation of internal decadal climate variability, which sometimes enhances and sometimes counteracts the long-term externally forced trend. Internal variability thus diminishes the relevance of trends over periods as short as 10 to 15 years for long-term climate change (Box 2.2, Section 2.4.3). Furthermore, the timing of internal decadal climate

Frequently Asked Questions

FAQ 5.1 | Is the Sun a Major Driver of Recent Changes in Climate?

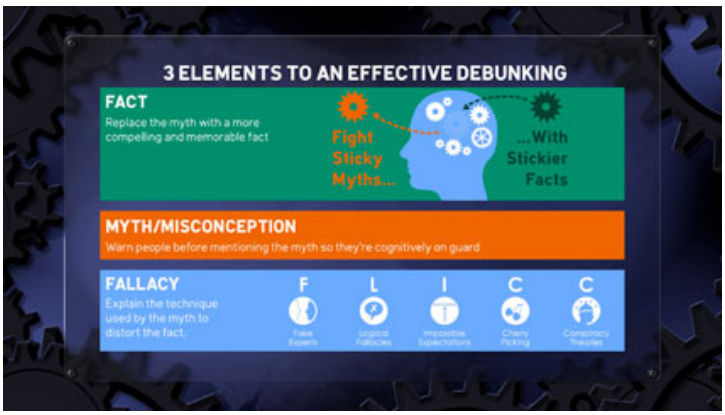
Total solar irradiance (TSI, Chapter 8) is a measure of the total energy received from the sun at the top of the atmosphere. It varies over a wide range of time scales, from billions of years to just a few days, though variations have been relatively small over the past 140 years. Changes in solar irradiance are an important driver of climate variability (Chapter 1; Figure 1.1) along with volcanic emissions and anthropogenic factors. As such, they help explain the observed change in global surface temperatures during the instrumental period (FAQ 5.1, Figure 1; Chapter 10) and over the last millennium. While solar variability may have had a discernible contribution to changes in global surface temperature in the early 20th century, it cannot explain the observed increase since TSI started to be measured directly by satellites in the late 1970s (Chapters 8, 10).

The Sun's core is a massive nuclear fusion reactor that converts hydrogen into helium. This process produces energy that radiates throughout the solar system as electromagnetic radiation. The amount of energy striking the top of Earth's atmosphere varies depending on the generation and emission of electromagnetic energy by the Sun and on the Earth's orbital path around the Sun.

Satellite-based instruments have directly measured TSI since 1978, and indicate that on average, ~1361 W m^{-2} reaches the top of the Earth's atmosphere. Parts of the Earth's surface and air pollution and clouds in the atmosphere act as a mirror and reflect about 30% of this power back into space. Higher levels of TSI are recorded when the Sun is more active. Irradiance variations follow the roughly 11-year sunspot cycle: during the last cycles, TSI values fluctuated by an average of around 0.1%.

For pre-satellite times, TSI variations have to be estimated from sunspot numbers (back to 1610), or from radioiso-

Research provides clear guidelines on how to structure science communication, particularly when misconceptions are involved. The most important thing is to communicate the science clearly. But there must be an explicit refutation of the misconception, flagged as coming before it is discussed. Lastly the techniques used to communicate the fallacy should also be examined.



So the IPCC should tackle misconceptions in published content, but adopt the guidelines of published research. One option is for the physical scientists to write the content, and to collaborate in presenting it with social scientists who have expertise in the psychology of misinformation.

Chris Field asked whether the refutation of misinformation was more effective coming from within the IPCC or from outside. **Andreas Fischlin** asked whether FAQs in the report could play a role. **Jim Skea** said that scepticism about the physical science was less evident now than earlier in the UK. Instead arguments were raised that climate change is happening but it is not worth doing anything about it, or that ambitious climate action is immoral as it inhibits the ability of developing countries to grow out of poverty. **Nick Nuttall** asked why challenges to climate science were so strong in the Anglo-Saxon countries. **Asher Minns**, of the University of East Anglia and Future Earth, asked how many people had to sign up to climate science before misinformation could be considered to be refuted. **Richard Black** asked why there were no groups countering misinformation about solutions and policy in the way that groups tackled fallacies about climate science. **Suraje Dessai**, of the University of Leeds, raised the challenge of dealing with misinformation about findings with lower confidence, for instance regional projections.

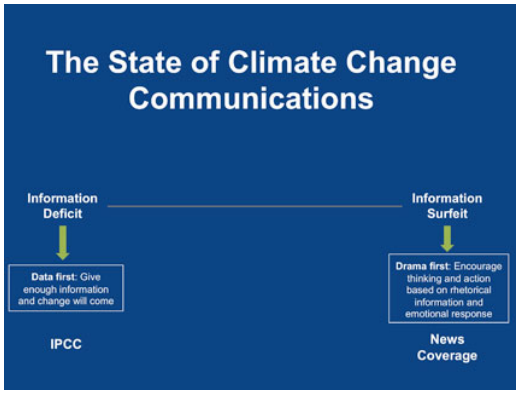
John Cook said that scientific findings should be accompanied by an explanation when they are released to inoculate them against misinformation. It would be natural to combine them with an explanation of the misconceptions. It does not require a huge change to content, and for the IPCC it could be done with FAQs. Misinformation about climate policy is present in the Anglo-Saxon countries but articles about science still predominate there. So arguments against science cannot yet be ignored. The target audience for refutation is not those who reject science in any circumstances but undecided people open to evidence and vulnerable to misinformation. Data shows there is still confusion among the public about whether climate change is happening and this is countering the impact of the IPCC's findings. But there also need to be responses to misinformation about climate policy and solutions. Regarding uncertainty, much of the misinformation relates to areas that are already well understood, but in countering misinformation it is important to identify the areas of science that are well understood and those that are less so.

Jonathan Lynn said much of the work of countering misinformation would be handled by third parties. The IPCC could play a role at the outset, for instance by including FAQs in its reports, but there was no role for the IPCC to engage with misinformation about climate science in blogs or the media. Conversely it would respond to misinformation or misconceptions about the way it works.

Session 16: Beyond the transmission belt – "upstream communications" and stakeholder values

Paul Lussier, of Yale University, noted there are recommendations to engage with stakeholders and to engage with social media, but really these are the same thing: social media is driven by values and communities cohere around values. Often the discussion of social media revolves around values and stakeholders with the same values. Discussion also tends to include colourful, exciting, engaging versions of graphs and videos. There is a place for that. But research shows that communities do not form around some-thing but around some-one. All the animations in the world cannot match articulations about content that relates to what moves me, what I'm excited about, what I'm joyful or angry about.

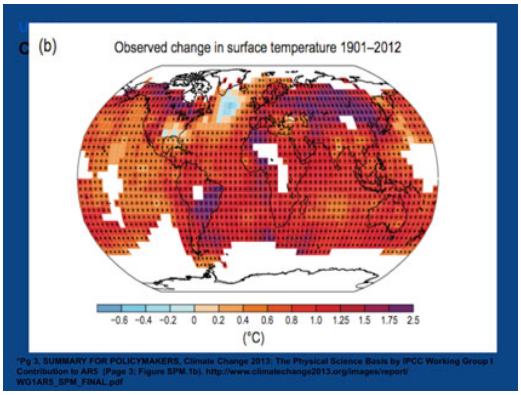
When we talk about social media, we are usually not talking about new communications models, yet we must engage in new models in order to leverage our work. Environmental communications generally discuss the planet, not people.



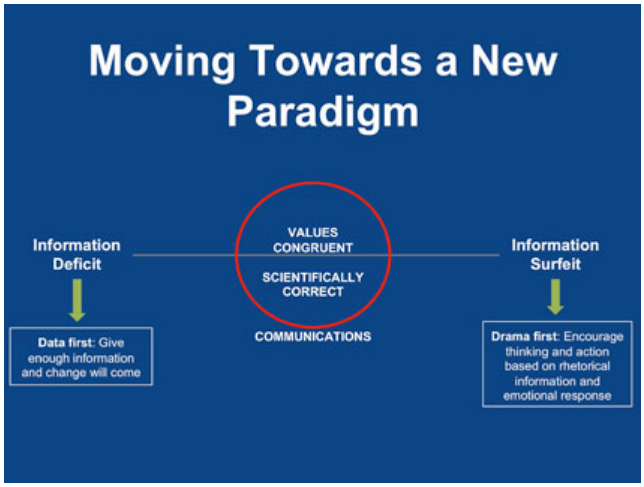
This is difficult when we try to create compelling media about environmental issues that people want to watch, because of the perception in media companies that the environment is about the planet, not about people. Stories about business or social justice belong somewhere else, not in the environment silo.

The media works with the information surfeit model. Don't focus on the facts because people already have too much information. Engage your audience and make it dramatic.

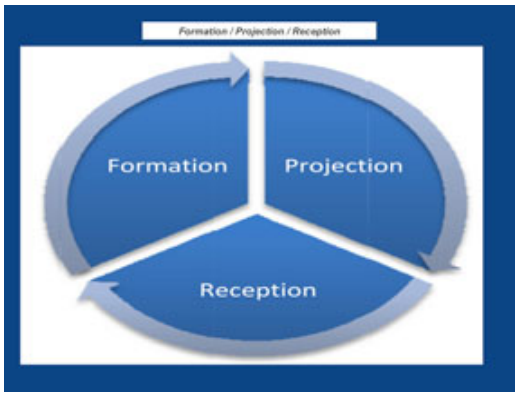
The traditional approach of science communicators is to give people the facts. Make it funny, make it digestible, but it's a fact-driven approach.



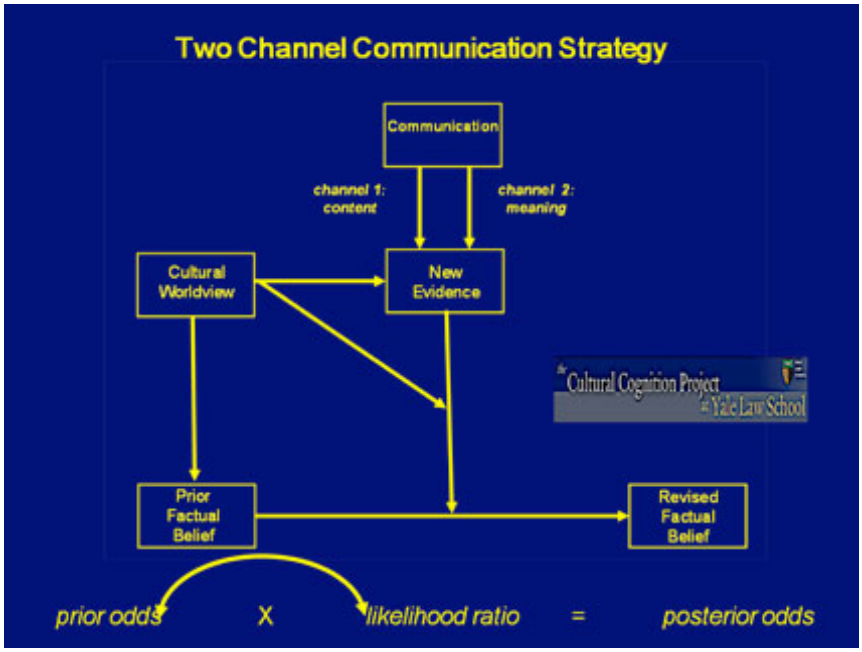
Both of these are weak. Neither has the "long tail". The information deficit model leaves people weary and challenged while the information surfeit model leaves them bleary and cathartic, and does not last.



We have developed a model that focuses less on downstream communications, on how we message science. Here the traditional approach is to add on communications at the end of producing the science.



Instead we focus on what we are messaging: not what we can do about climate change but what addressing climate change can do for us. So our messaging does not just reflect what we are asking of people, but what the science is asking of us. We determine the science then allow others to interpret it. Here, we focus first on the upstream aspect of communications (formation), then on what we actually say (projection), then how it is received (reception). For our purposes here we will focus on formation of messaging.



This is the basis of our schema to build and deploy communications pathways through which science-oriented targets can be incorporated into stakeholder-siloed concerns. The aim is to marry knowledge and meaning, and connect evidence with evolving cultural world views in a way that allows for the facilitation of -- not the advocacy of -- revisions to people's "factual beliefs".

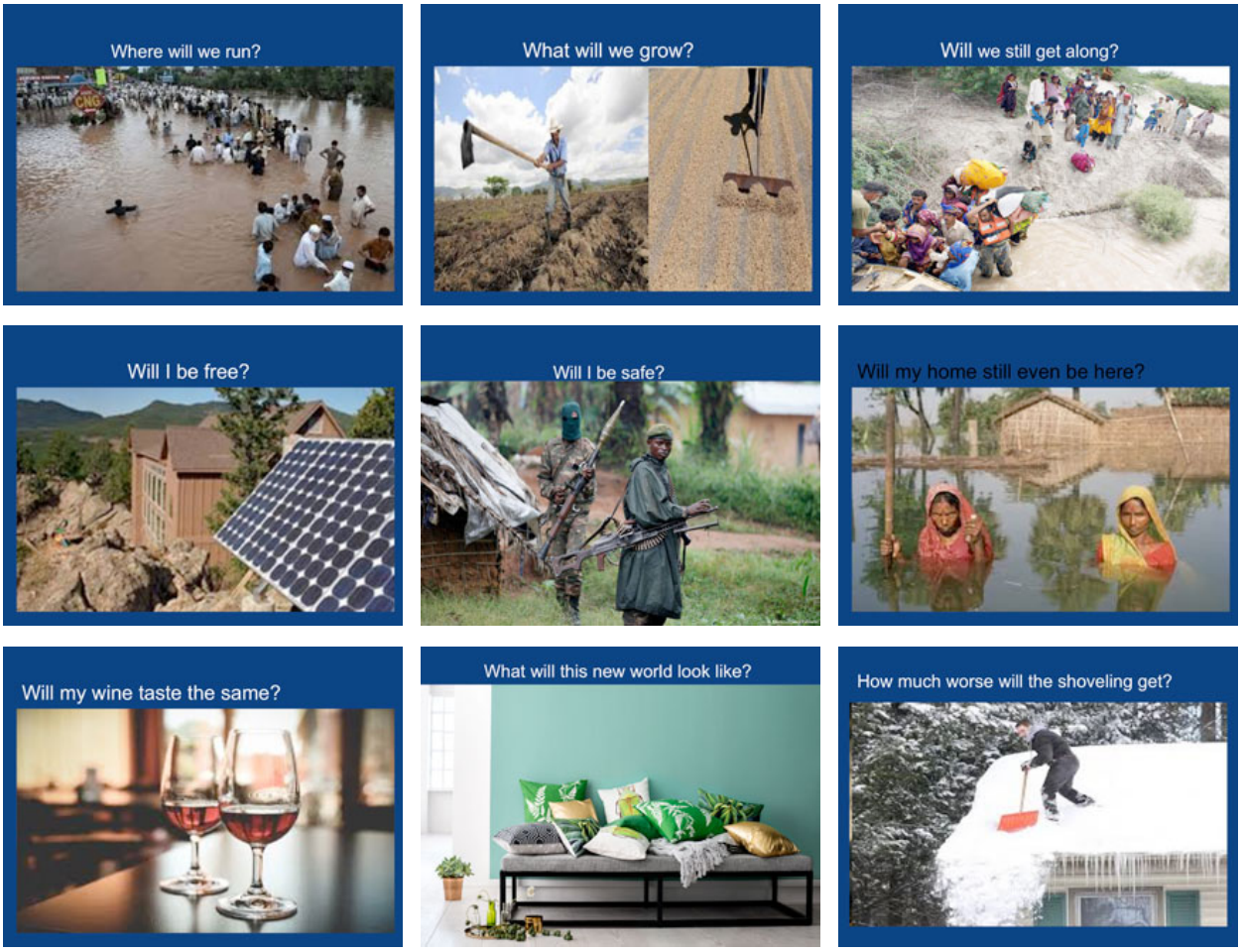
If we want to encourage and facilitate science uptake we must transpose messaging into less about something, and more about someone. These approaches are not mutually exclusive. We want to generate a reaction when someone reads an IPCC report…

I'm excited because my concerns are reflected in this document. Thus we move from questions like *Why is carbon dioxide increasing so much?*

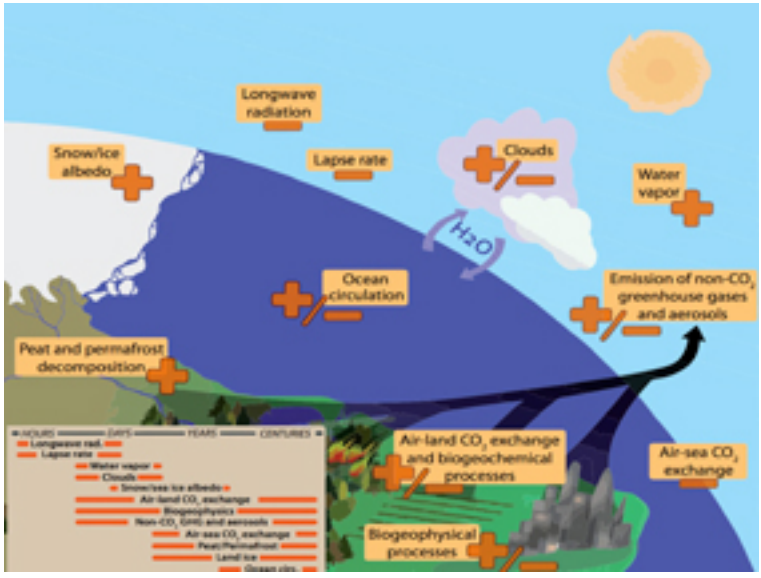
to *How is rising carbon dioxide affecting the choices a consumer makes?*

How does rising carbon dioxide affect the choices a supplier makes?

Where will we run?, What will we grow?, Will we still get along?, Will I be free?, Will I be safe?, Will my home still be here?, Will my wine taste the same?, What will this new world look like?, How much worse will the shoveling get?



Data about climate change offer opportunities to connect the data to individual sector concerns.



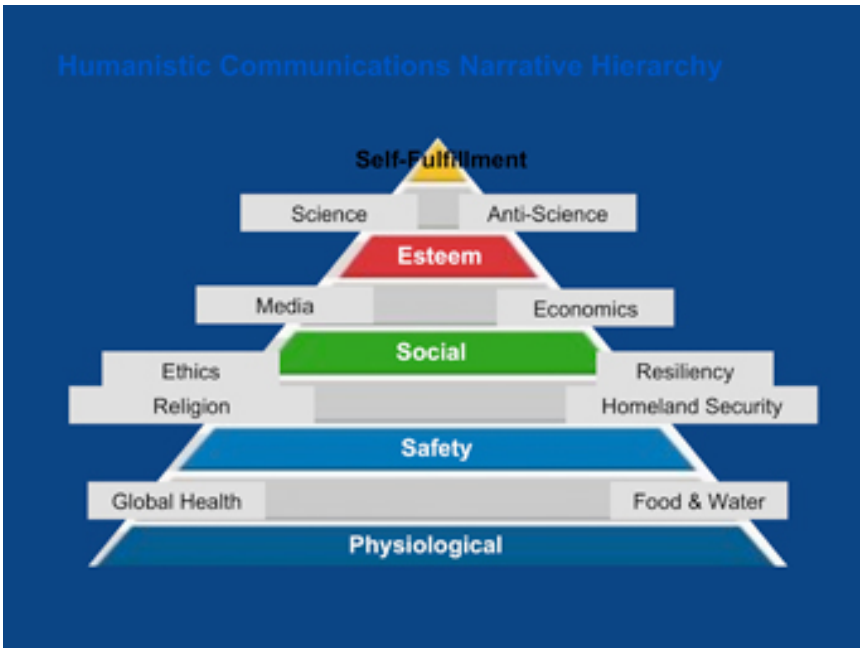
We see each of these data modules as narrative rubrics that we can use to create narratives to connect to each of these human sectors (science, media, policy, business, belief). We have held a series of workshops around the world to examine language used by different groups. We find that in bringing in different stakeholders we speak different languages in terms of their primary values. We all speak different languages. The table shows primary value for the languages we speak – e.g. for science "accurate", for business "actionable".

Defining Language and Narrative Determinants Science and Other Sectors

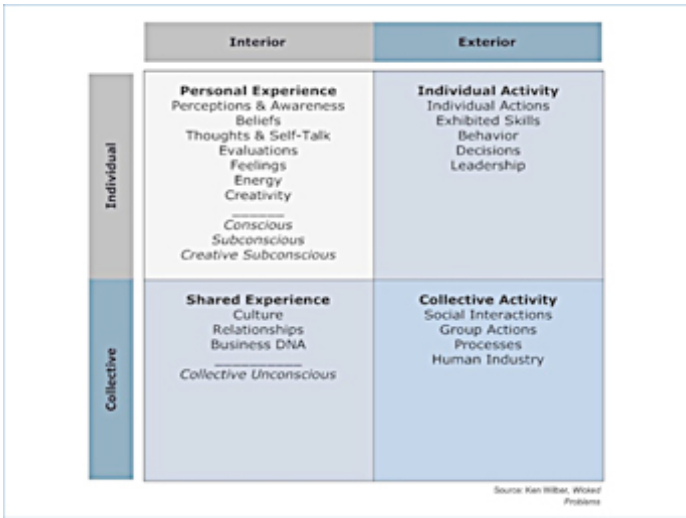
SCIENCE	MEDIA	POLICY	BUSINESS	BELIEF
Accurate	Dramatic	Realistic	Actionable	Archetypal
Qualifying	Engaging	Speaks to Need	Speaks to Revenue	Circumscribing
Highlight Uncertainty	Highlight Certainty	Highlight Risk	Highlight Benefit	Highlight certainty
Cautious	Certain	Careful	Candid	Anthemic
Build Case for Further Research	Build Audience and Interest	Build Constituency	Build Business Case	Build following
Objective	Persuasive	Popular	Visionary	Persuasive
Generate Understanding	Generate Ratings	Generate Momentum	Generate Shareholder Interest	Generate action
Steer Clear of Policy	Commit to a Conclusion	Commit to Policy Recommendations	Build Science-Based Business Scenarios	Community Ethos

This might suggest there are entirely opposite sets of values when science and media are together. We like to blame naysayers and media consolidation for the low coverage of climate change. But there is a need to build bridges between the two to generate stories based on combined understanding: it does not have to be either/or. We can highlight the need for certainty and marry it with scientists' need for accuracy, or the policymaker's desire to be careful with a scientist's instinct for caution.

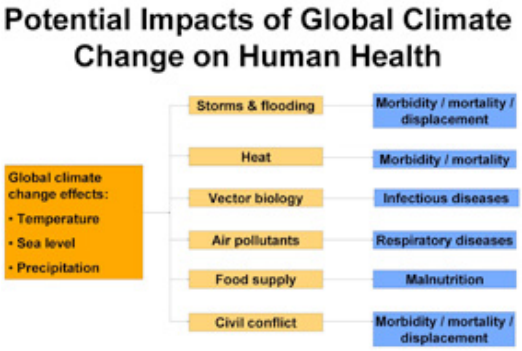
Research based on Maslow's hierarchy of needs shows that questions of science and anti-science tend to arise at the top of the pyramid, where people are already fulfilled and can afford a global view. At the lower levels where survival is the main concern, the narratives are of health or food and water.



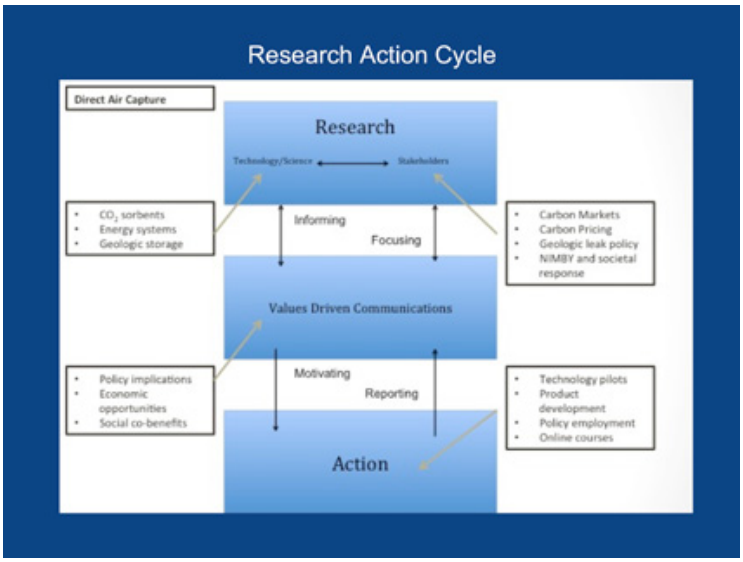
Within each of these silos we can speak to the most important parts of our beings. I want to share my interests with others who also prioritize my values based on these "I', "it", "we", "its" quadrants.



This shows an example of how we must move from the data into narratives of real experience, e.g. with health drawing on climate change data, via information about air pollutants, to stories about respiratory disease. And these become the basis for communities and network building, since narratives form the corps of network structures (bucket brigade, military squad, moveon.org, telephone tree, etc.)



This is an example of how we are moving from research to action, asking policymakers to invest resources and research in this modality. We process information through communications via stakeholders who have a part in developing the upstream communications for the conversation.



This can be applied to the question of which images are found to be inspiring and prompting action. Focus groups have shown that the image of earthrise over the moon, so powerful a few decades ago as an image of a fragile, unique planet, is much less effective now compared with an image of a boy with a dog in a typhoon. This is not because that image shows people; it is because people see themselves in the boy and imagine a narrative, not only about him, but about themselves and what they would be doing.

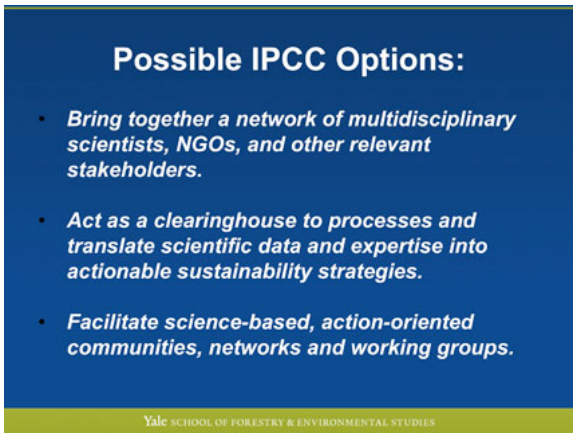
Wine growers want to know what type of grapes to grow, what will be the effect on my industry, how can I help mitigate the effects of climate change?

This concern drives itself - science need not drive it.

Responding, **Beth Holland** said she would provide a perspective on the unique circumstances of the South Pacific, which includes those countries most threatened by sea-level rise. She expected when she arrived at the University of the South Pacific that she could combine knowledge of the scientific facts with the vulnerability of local people to make a difference. She failed initially because of a lack of Pacific experience, she did not know her audience, and she arrived in the wake of the controversy about Himalayan glaciers that undermined the IPCC's science credibility. In response she focused on stakeholder engagement and spent time listening, especially in villages as she was working on a project involving village-level adaptation. A robust training programme for climate scientists was set up, with a postgraduate programme at the university. This made it possible to work with governments in the COP process, providing policy briefs and negotiators. This built credibility, making it possible for the local scientific community to go to political leaders as negotiators and show them the science they needed.

Adam Corner agreed with the importance of engaging with values and language and asked how that could be mapped over to the work the IPCC does. Perhaps this is a role for derivative products associated with IPCC reports: ask your audience, find out who they trust. **Lindsey Fielder Cook** agreed that it was important to talk about the personal dimension. She recalled the finding in AR5 that under business as usual scenarios it may be difficult to work outside in some areas for parts of the year. How do we explain what that means for individuals? People want to know what is happening now, how urgent is it, and what can they do. What is causing the fear that seems to be behind some of the scepticism and pushback? **Claudio Angelo**, of the Observatório do Clima, asked how upstream communications can be reconciled with the IPCC's stance on neutrality.

Paul Lussier said scientists are not being invited to engage in values recommendations or prescriptions. They are being invited to partner with stakeholders to give their values a scientific basis. Stakeholders ask how science can address their concerns. This approach, bringing together scientists with winemakers in California, has led to winemakers funding higher resolution models to give them more information they can use to pursue their goals affected by climate change. In Mozambique, we hoped to encourage climate change education and awareness. We ended up engaging with meteorologists and discussed how the frequency and severity of typhoons would only increase due to climate change. We developed signage and a "tree house" disaster network, and obtained more funding for climate change mitigation. We determined it was important to engage with the stakeholders and find out what their priorities were, and address those.



Beth Holland said that knowing what users' values are and listening to them to understand their concerns is the most important thing for getting the combined power of the wonder of science with the perils and triumphs of being human. She recalled that she could not find measuring sticks to demonstrate the threat of sea-level rise. Then she realized that Pacific canoe paddles are about one meter in length and was able to use those to illustrate how much the ocean could rise. The exact numbers do not matter, but the perception of the sea rising by the height of one or more upright paddles was powerful.

Paul Lussier suggested that it was important to aggregate the priorities of different groups with particular interests in order to help address broader questions from individuals or groups about how to deal with general problems in each region regarding climate change.

Laura Gallardo questioned whether a focus on individuals or stakeholders implied we are all selfish rather than collaborative. **Jessica Dator-Bercilla** said people in the Philippines were seeing the drama of climate-related disasters at first hand and were moved by the impacts, but now they want to know what to do about it. **Leo Meyer** said the best way for the IPCC to serve stakeholders was through assessments of peer-reviewed literature. Therefore stakeholders must ensure that there is a body of peer-reviewed research for the IPCC to work on. **Chris Field** said the discussions had underlined how IPCC audiences are not homogenous. There are already plenty of valuable communications tools in the suite of AR5 communications materials that are available.

3 Breakout Group Discussion Summaries

Reports prepared with the help of the listed co-chairs and rapporteurs

Breakout Group A: Improving Readability, Clarity and Policy Relevance

Co-Chairs: Richard Black, Debra Roberts
Rapporteur: John Cook
Rapporteur for the IPCC Communications Strategy: Christiane Textor

This Breakout Group covered a range of topics mainly relating to the structure of the report and processes for producing it, to tackle a problem raised by many users: that the Summary for Policymakers (SPM) is difficult for non-specialists to understand and therefore hard to use in their own work in disseminating information about climate change. This problem has also been raised by policymakers in different countries, indicating that the policy-relevance of the SPM is impaired.

Processes

Here the discussion concentrated on two main areas: the involvement of end-users in the design of the report and the use of specialists to enhance the clarity of text and graphics.

Reflecting a similar recommendation from Breakout Group C, the group proposed that Working Groups should seek input from stakeholders in the scoping process. This is to ensure that the report reflects stakeholders' information needs. They recommended developing a methodology to obtain this input. They also proposed that the scoping process should be iterative, as the report develops, to ensure that it meets stakeholders' priorities.

Specialists with professional skills and experience in communicating can also contribute to the clarity and accessibility of a scientific text intended for non-specialist audiences. Thus communications skills should be one factor to consider when nominating and selecting authors, although this would not apply to all authors. Appropriate specialists, such as science writers, from a range of disciplines, should be involved at all stages of the report, and not only when the report is finalized. And the IPCC can learn from the experience of other organizations that produce and communicate assessments.

This can be complemented by training for authors, in writing and communicating, including developing guidance notes on effective style. This is in addition to training to help authors interact with the media. Training on presentation skills can improve the quality of outreach to diverse audiences and help authors convey information to non-specialists.

The group also discussed two specific communications areas. Regarding graphics, it recommended that graphic designers and data visualists should be brought in early to help clarify what type of graphics should be used. The approach to graphics should take into account the findings of communications science, and authors should be given training in the effective use of graphics. Graphics should be tested for intelligibility at the review stage and simplified versions of graphics should be prepared for the SPM and outreach if necessary. Graphics and underlying data should be archived for transparency and traceability.

The group also discussed the treatment of uncertainty (see Advance Paper by David Budescu), and recommended an Expert Meeting should be held that can lead to more effective and intelligible treatment of risk and uncertainty based on findings from communications science and advice from communications professionals. (See related proposal by Breakout Group B.)

Structure

The group considered calls by some users for a more readable and accessible "Summary for Citizens" in addition to the SPM. It concluded that possible improvements to the SPM rather than an additional summary would meet this objective. The SPM should highlight the most policy-relevant findings rather than attempting to be a fully comprehensive reflection of the full report. It should be as short as possible, with agreed page limits (and with guidance on length from stakeholders in the scoping process). It should highlight key messages at the start, by using headline statements or an executive summary. If resources allow, working groups could explore the possibility of a multi-layer, interactive report that would be accessible to different users. As already done in AR5, the report should contain Frequently Asked Questions (FAQs).

Breakout Group B: Derivative Products

Co-Chairs: Leo Meyer, Simbisai Zhanje
Rapporteur: Joyashree Roy
Rapporteur for the IPCC Communications Strategy: Youba Sokona

This Breakout Group examined the role of materials produced to communicate IPCC findings to different audiences, sectorally or geographically, known as derivative products. The group reviewed materials produced by the IPCC itself outside the formal approval process for reports, such as "supporting material"[1] for expert meetings and workshops, and communications and outreach materials developed by the Working Groups or Secretariat.

Third-Party Derivative Products

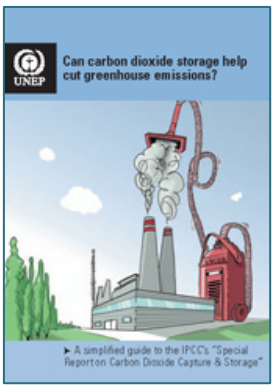
The experience with previous assessments has shown that such third-party products can be highly effective in communicating IPCC findings to specific audiences. It would be impossible for the IPCC to undertake this task itself, given the number of potential audiences. Third parties may have a particular understanding of the needs of different audiences, have greater freedom than the IPCC to communicate findings as they are not bound by approved language and can use graphics and data visualization in ways that may not be appropriate for the IPCC. At the same time, the IPCC has a strong interest in ensuring that such products accurately reflect IPCC Assessments.

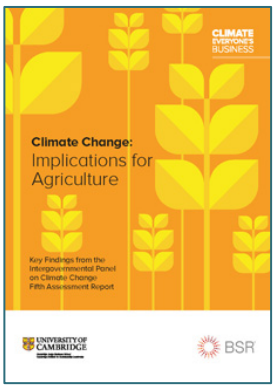
The IPCC should therefore continue to encourage the development and production of derivative products by third parties. These are encouraged to use interactive infographics and data visualization. IPCC authors, co-chairs, and staff from the Technical Support Units and Secretariat are encouraged to provide support by reviewing products, subject to availability of resources including time. IPCC authors should get visible recognition for their contributions. Third-party products should carry a clear disclaimer that responsibility for the content rests with the third party, not with the IPCC.

In the past, the IPCC's sponsoring bodies, the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), have produced derivative products. They and other UN agencies should be encouraged to do so in future.

As part of a general effort to make the IPCC website more accessible and user-friendly, the website should include links to third-party derivative products found appropriate by the co-chairs or Chair. Printed copies may be distributed at IPCC outreach events or other meetings attended by the IPCC.

The IPCC could stimulate and coordinate the development of such materials by consulting stakeholders, including representatives of organizations that can produce such products, on the types of products that would be useful, during the scoping process.





[1] IPCC Procedures Appendix A Section 6 http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a-final.pdf

IPCC Materials

Concerning "supporting material" produced by the IPCC, it would be valuable to have an Expert Meeting early in the Sixth Assessment Report cycle on the science of communicating climate change, looking among other things at the psychology of the reception of IPCC findings. (See related proposal by Breakout Group A.)

Representatives of stakeholders, including those producing derivative products, should be invited to become Expert Reviewers, and meetings between them and authors may be held during review periods, as provided for by IPCC Procedures[2]. This would give third parties early access to drafts and allow them to comment on them, supporting their own production work.

The videos produced by the IPCC for the Fifth Assessment Report were useful. Future videos should be shorter, and make greater use of explanatory animation and spoken text coupled with images rather than talking heads. Videos should be made available in languages other than English. Videos illustrating the work of individual IPCC authors would be useful.

Press releases on the release of reports – carefully prepared in cooperation between Working Groups and the Secretariat in advance of finalization and adjusted following approval of the SPM – are a key element in communicating findings through the media. The document should include the key messages from the report that media can cut and paste.

The IPCC does not need to engage on a regular basis in rebutting misinformation on climate change issues that appears in the media. The IPCC may respond if misinformation is spread about the way the IPCC works, and a rapid response would be required if a major crisis on IPCC findings arises.

Frequently Asked Questions (FAQs) have proven useful and should be used in all IPCC Assessment Reports. These FAQs should address obvious questions of interest to the public, and draw on the best practices of communications science and psychological research to ensure they are effective in communicating findings accurately.

The IPCC may facilitate contacts with authors for governments and non-governmental organizations, for instance by providing lists of authors willing to engage in this way on the website.

[2] IPCC Procedures Appendix A Section 4.3.4.1

Breakout Group C: Stakeholders and Outreach

Co-Chairs: Rabelani Tshikalanke, Jean-Pascal van Ypersele
Rapporteur: Jessica Dator-Bercilla
Rapporteur for the IPCC Communications Strategy: Eduardo Calvo

This Breakout Group examined ways the IPCC could enhance its engagement with stakeholders to gain a better understanding of how they use IPCC reports and what they want from them, in order to improve policy-relevance. In particular it reviewed the IPCC's outreach activities and use of social media. The most important user of IPCC reports is the UNFCCC. Policymakers at all levels of government are the key audience. Stakeholders from civil society and practitioners from different sectors also work with IPCC materials and need them to be accessible and user-friendly, without impairing the integrity of the text. In its endeavours to be more policy-relevant, the IPCC must not become policy-prescriptive.

Scoping

Similarly to Breakout Groups A and B, this group identified the scoping process as an important moment for anchoring policy-relevance in a future report. The IPCC Procedures[3] already note that participants at scoping meetings should include experts with a background from relevant stakeholder and user groups, including governments. The question arises how to increase the participation of such experts in scoping meetings to increase the relevance of reports to different types of stakeholders by understanding their needs and priorities in an IPCC Assessment.

Options include preparing a communications plan explaining the scoping process and the channels through which experts from stakeholder groups can provide input. Such material can be channeled to observer organizations and national focal points.

It is important to include representatives from all levels of government and a range of stakeholders and interested sectors, e.g. cities, civil society, youth & children, business, faith groups, etc. UN agencies, observer organizations and climate change networks can help identify representatives.

Pre-scoping meetings with different stakeholder groups can be organized to discuss priorities, and the output of these dialogues can be feed into the scoping process.

Scoping meetings can also consider the use of tagging, in consultation with stakeholders, which would enable users to pull up targeted sector-specific reports. In this case the scoping meeting could propose a preliminary list of tags.

Outreach

The IPCC Communications Strategy[4] already urges the IPCC to make its findings available and accessible to broader audiences outside the immediate policymaking community. The aim of outreach is to ensure that this is done effectively.

The IPCC could better define the various target audiences of its outreach activities as well as the objectives of communication with these audiences, bearing in mind the limits to IPCC resources and capacity, and the ability of third parties, including organizations such as UNEP and the WMO, to engage such audiences effectively. For instance, to what extent should the IPCC increase its communications to the general public? How can the IPCC reach children and what is the objective of communicating with them?

[3] IPCC Procedures Appendix A Section 4.1

[4] Communications Strategy Paragraph 5 http://www.ipcc.ch/meetings/session35/IAC_CommunicationStrategy.pdf

The Structured Expert Dialogue with the UNFCCC, the IPCC's main stakeholder, contributed effectively to the negotiation process, and such communication should be developed.

Outreach events offer an opportunity to draw out the relevance of IPCC findings to local conditions. One way is to involve authors from the host country or region. The Secretariat can work with hosts and partners to develop a programme that reflects regional priorities. And local hosts can identify suitable participants from stakeholder and practitioner groups, e.g. ministries, met offices, cities and municipalities, disaster risk management, water management etc.

As also discussed in Breakout Group A, IPCC authors can reach audiences more effectively with training in presentations for non-specialists, media training and speaker guidelines tailored for each event.

The Secretariat can prepare generic presentations, with validation by the Chair/co-chairs, which can be customized by individual authors for specific events.

Recent outreach activities have benefited from the participation of developing country delegates from neighbouring countries or other regions of the host country, supported by voluntary contributions from member states. The IPCC could look for ways to encourage and facilitate such cooperation in the future. The IPCC could also investigate the possibility of opening the Trust Fund and other funds to voluntary contributions, bearing in mind the risks of a conflict of interest.

Given the effort and resources involved, the IPCC should investigate how to evaluate outreach and compare the impacts with different audiences.

The IPCC should engage with organizations that take elements of IPCC Assessments and communicate them in more audience-specific ways (see discussion in Breakout Group B).

Social Media

The IPCC takes a conservative approach to social media, and could investigate how to broaden use to improve knowledge of the IPCC's findings, operations and activities. It could also analyse past social media use both for official communication and by the broader community of experts involved in IPCC reports to better understand the perception of the IPCC and its messages, the types of audiences that are reached, the accuracy of the messages, coherence between messages from different sources, and the potential for networking, e.g. with other UN organizations. Communications professionals may provide useful guidance in this evaluation.

Outreach events, and other IPCC activities if appropriate, can broaden their reach through webstreaming. Social media can also be used to deliver short videos (see also Breakout Group B).

Breakout Group D: Media Relations

Co-Chairs: Monica Araya, Tim Nuthall
Rapporteur: Heidi Cullen
Rapporteur for the IPCC Communications Strategy: Ko Barrett

This Breakout Group examined IPCC communication through the media, before, during and after the release of a report.

Like Breakout Group A, it found that Working Groups would benefit from the inclusion of communications specialists, such as science writers, to promote clarity and readability. The group also recommended the presence of staff or authors who would understand the public policy landscape and how news media might filter or handle some findings, especially controversial ones.

Pre-Release

Building relationships with the media must start well before the release of a report. It is important to brief media on how the IPCC works so that they understand the process. Attending industry conferences is one option.

The Chair/co-chairs and others can brief media before finalization, focusing on topics in the outline, not prejudging the final approved text.

Co-chairs and TSU and Secretariat communications staff should establish strategic communications objectives and start to develop key messages and FAQs at the time of the first-order draft. These will be refined at the time of the first SPM draft.

Take control of the inevitable leaks of review drafts. Despite significant efforts to keep them confidential, every draft was leaked during the last assessment cycle. The IPCC should plan for these leaks: do not confirm substance, but provide context from approved outlines. External scientists are freer to comment. Consider revising procedures so that official drafts are released to the public at the time of review, not after publication of the final report. Do not release rough early drafts (e.g. the "zero-order draft") that may diverge significantly from the final product. Owning the release of the draft ensures that the IPCC can directly handle questions from the media and help frame the emerging content of the report over the course of the approval process. In any case be transparent about the limits on transparency, and explain why some things are not open.

Convene editorial board meetings with key media for the Chair/co-chairs.

The media landscape and media technology will change. Be prepared to embrace new opportunities in 5-6 years, while continuing to recognize the role of radio and mobile.

The Release

Plan for a press conference on a Monday. The weekend is to allow accredited media to study the embargoed text, to allow time for the Chair/co-chairs and authors to rest, to allow member states to prepare and translate materials for their launches, and to prepare for the press conference. Rehearsal time is mandatory.

The launch of a report should be handled globally, backed by regional launches, and in a way that supports non-English speakers.

Interviews should be offered with a range of authors who have undergone media training. Include a local context in media training where possible.

Broadcasters and web-based media need professionally produced multimedia products including animations, infographics and video. As discussed by Breakout Group A, simpler versions of graphics should be produced for broadcasters and online media.

Given the IPCC's limited resources, it is important to rely on multipliers. Within the media, that is wire services. Building a network of networks, with their own communications capacity, can also be powerful: engage with institutions and sectors interested in climate science, and tap into communications officers at research organizations and scientific societies.

4 Side Event

Side Event – Children's Panel on Climate Change

The Children's Panel on Climate Change (Barnas Klimapanel) is a group of Norwegian children collecting information about climate change for children and presenting it to policymakers. They explained their work to participants of the meeting and then led a discussion. Topics discussed included how they could use IPCC materials, how they could interact with the IPCC, and how similar organizations could be set up in other countries. They reinforced the message that IPCC materials are often too complex for non-specialist audiences, and underlined the need for materials on climate change that are accessible to young people. Following the presentation they took part in the breakout session with Breakout Group C (stakeholders).

From left: Kristiane Reigstad, Kaja Nyland, Elida Haltbrekken Tveitdal, Sara Sørbye, Eliah Hudgins (back), Victor Larsen Steenberg (front), Jarl Erik Torghatten Halvorsen

From left: Kaja Nyland, Kristiane Reigstad, Elida Haltbrekken Tveitdal, Sara Sørbye

From left: Jarl Erik Torghatten Halvorsen, Victor Larsen Steenberg, Eliah Hudgins

5 Conclusions and Recommendations

Conclusions and Recommendations

The Expert Meeting, through discussions in breakout groups, came up with a long list of recommendations that would enable the IPCC to communicate more effectively in AR6.

Many of these ideas – from media training for authors to the use of FAQs, from explaining to journalists and other stakeholders how the IPCC works to presentations for young scientists, from the use of embargoes to cooperation on third-party derivative products – were already tried and tested in AR5. So it was useful to have them endorsed for the future. The forthcoming revision of the Communications Strategy will provide an opportunity to take up many of these recommendations.

The recommendations below are arranged thematically. But a number of general principles emerged from the Expert Meeting:

- Communications are an integral part of the report process and work on communications (e.g. considerations of clarity and working with specialists) should start at the outset of developing the assessment.
- Effective outreach requires engagement with stakeholders, also from the outset, to understand what they are looking for in an IPCC report.
- The media landscape is changing rapidly and the IPCC must be nimble and responsive so that it uses the best technology when future reports appear.
- Communicating IPCC findings to diverse audiences is a huge task. The IPCC cannot do it all. Third parties have an important role to play and the IPCC must define how it will work with them.

Detailed Recommendations

General

- The IPCC can't do everything in communications and there is a role for third parties.
  - The IPCC should clearly define the boundaries of its communications role, but should also define clearly how it intends to engage with third parties wishing to take its core material and make it more accessible to broader audiences. Third parties can draw on resources that go beyond the IPCC's funding possibilities.
  - The IPCC should make it clear that it is not responsible for third-party products.
- Update the IPCC Communications Strategy and especially its Implementation Plan to make it simpler, less prescriptive and more flexible.
- To reach broader audiences communications about the IPCC and its products should also be available in languages other than English.
- Given radically changing communications, the IPCC should be prepared to adapt its Communications Strategy and Implementation Plan between now and the release of the Sixth Assessment Report, and survey the communications technology and media landscape for new opportunities.
- Enhance cross-Working Group cooperation throughout the process, including scoping and drafting, and identify ways to implement this.
- Enhanced communication and outreach activities have financial implications: the Panel should explore ways to increase the availability of funding, including voluntary contributions from external stakeholders (paying regard to possible conflicts of interest).

Clarity, readability, access - general

- Involve communications specialists from a range of disciplines in the writing process (decision of the 41st Session of the Panel), from the scoping process onwards.
  - Communications skills should be taken into consideration in selecting author teams and TSU staff.

  - Author teams should include or be supported by science writers (scientists, or journalists with a science background, who write professionally about science for non-specialist audiences), at least in the SPM team.
  - Author teams or TSUs should include someone who can understand how stories are filtered through the news media and the public policy landscape and how this affects the reception of IPCC findings.
  - Specialists from a range of communication disciplines including graphics designers and data visualists should be involved at all stages.
  - Authors should be trained in writing and communicating, including the use of clear language, as budgetary resources allow. A guidance paper on writing (e.g. short sentences, no jargon) should be established with the help of professionals.
  - The approach to graphics especially for the SPM should take account of the findings of communications science, e.g. psychological studies of how visual images are received and understood.
  - Avoid the temptation to squeeze too much information into graphics that are difficult to understand, in an effort to comply with page limits.
- Use search tags in scoping and drafting to ensure material relevant to particular groups is readily accessible (Communications Strategy §5).
- Authors should receive training in giving presentations as well as media training (with provision of templates for consistency), as resources allow, and starting early on.
- Derivative products are often based on individual chapters so it is also important to pay attention to brevity, clarity and readability in the full report.
- While Assessments develop incrementally using previous Assessment Reports as a starting point, the Report itself should be written so as to be self-contained, setting out the current status of knowledge without repeated references to how things have changed since the previous Assessment.
- See proposal for Expert Meeting below.

Clarity, readability, access – summaries

- The report should be written clearly and elegantly, with particular attention paid in this regard to the Summary for Policymakers (SPM), Frequently Asked Questions (FAQs), Executive Summaries and Headline Statements.
  - Give priority to policy-relevant questions in the SPM. The SPM does not need to cover the findings of every chapter. It should be as short as possible, with page limits.
  - While a separate "Summary for Citizens" has been considered, possible improvements to the SPM rather than an additional summary would serve this purpose. It should have a clear storyline and should be conceived and written in a clear and highly accessible way, with the most important and relevant findings brought to the top, e.g. as an Executive Summary or through headline statements. It should be supported by communications materials in language and graphs tailored to needs of specific audiences.
  - This shorter text at the top of the SPM need not include all the detail of uncertainty statements, ranges and some other details and data although this information should be available in the "full" SPM.
- Explore possibilities for a report in a multilayer, interactive form to make it more usable for different users (implies an electronic rather than print report, and has human and budgetary resources implications).
- Recognize the importance of graphics in communicating with non-specialists.
  - Consider what approval process is needed for animated graphics.
  - Graphics should be tested for intelligibility during review.
  - Authors should be trained in developing graphics.
- Graphics may be simplified for the SPM, broadcasters and outreach, if needed.
- FAQs addressing key questions in the public domain, as done in the Fifth Assessment Report, should be used in all assessments. Science writers should be involved closely in the production of FAQs.

Engaging with stakeholders to enhance policy-relevance

- The most important stakeholders are the UNFCCC, governments and policymakers **at all levels**, and the rest of the UN system.
  - Secondary audiences include business, IGOs, NGOs, youth and children, educators, faith groups, general public, and media including weather forecasters.
  - Engage policymakers at all levels including local; pay attention to sectors e.g. cities, disaster risk management, water management, agriculture, health etc.
- Better define audiences and the objectives of communication with them, considering how to make information available and accessible (including in languages other than English) so that it is relevant to them, without harming the integrity of the approved text (enforcing Communications Strategy §§4 and 5).
- Engage with stakeholders from the outset to understand their priorities and requirements so that the report is policy-relevant. You cannot simply bolt on communications at the end and provide information to "ignorant" audiences (information deficit model); you must understand what information is relevant and how it should be presented. Many users seek practical and actionable information in an IPCC report that can inform their behaviour and response to climate change.
- Engage with organizations that take elements of IPCC assessments and communicate them in a more audience-specific format (derivative products).
- The Secretariat and TSUs will nominate appropriate organizations to the Chair/co-chairs.
- Seek greater input from stakeholder groups in the scoping process (Procedures Appendix A 4.1).
  - Co-chairs and working group vice-chairs are encouraged to identify audiences and stakeholders who should provide input; observer organizations as well as governments can help them.
  - Working groups should develop a methodology to get their input (e.g. encourage governments to consult with stakeholders and forward information; encourage governments to nominate representatives of stakeholder groups as experts to the scoping meeting; hold pre-scoping meetings with stakeholder groups).
  - Involve communications specialists in this process and prepare a scoping communication plan explaining the process and how experts from stakeholders may contribute.
  - Conduct a needs assessment with stakeholders for derivative products at the scoping stage.
  - Representatives from different levels of policymaking should contribute.
  - Ask UN, observers and climate change networks to identify communications experts.
  - Scoping should be an iterative process.
  - Keep in mind the end users of the SPM when structuring and writing it.
  - Hold informal discussions with stakeholders at the pre-scoping stage. Consider publishing transcripts of these discussions or dialogues even though they are not formally approved, or webcasting proceedings.

Other outreach

- Share IPCC reports at events organized by other organizations.
- Ensure that outreach activities reach various stakeholder groups with dedicated events (including materials and discussions in languages other than English) as possible and appropriate.
  - Ensure that authors from the host country or region, or from other developing countries, are speakers at outreach events held in developing countries.
- Include events for local young scientists in outreach activities.
- Open the Trust Fund and other funds, including working groups, to voluntary contributions from other stakeholders (paying regard to possible conflicts of interest).
- Create a communications network of networks that are able to become more engaged in the development of the report and are then more informed and engaged at the point when the report is launched. Encourage this network to take the report and communicate it to their trusted audiences.

  - Engage broad range of institutions and sectors that have an interest in climate science.
  - Tap into communications officers at research organizations and scientific societies; these professionals are trusted by scientists and by journalists covering science.
  - Interact with associations/federations of science communications.
  - Social media is important in building networks.
- Consider how to evaluate outreach, including how it worked for different audiences.
- List authors, with contacts, role in report and expertise, on the website, who are willing to take questions from governments and NGOs.

Press materials and media relations

- Begin pre-release relationships with media by attending journalism conferences to educate them and lay the groundwork for understanding the process and eventual findings.
- Offer pre-report briefings by co-chairs/Chair or authors they designate, without prejudicing eventual findings.
- Co-chairs and the communications team from the Secretariat and TSUs should meet starting with the production of the first-order draft to establish strategic communications objectives, develop key messages and talking points and develop FAQs.
- Ditto with the first draft of the SPM (NB key messages are a communications tool not to be confused with headline statements that are the responsibility of authors).
- Convene editorial board meetings with key media outlets involving the Chair/co-chairs.
- Hold local (but webcast) media briefings on fringes of all IPCC meetings (lead author meetings, expert meetings) to promote local awareness of IPCC.
- Media training for authors is important and time should be scheduled and protected. Training should be linked to an actual opportunity if possible and done in the region so authors get a regional media context.
- Launch reports on a global basis, drawing upon and supporting non-English speakers: hold a global press conference and where possible simultaneous regional press conferences using local authors and webcasting.
- Aim for press conferences on Monday (not Sunday) – to give authors time to rest, do embargoed interviews, practise talking points, prepare for the press conference and allow member states to prepare their own national outreach strategies including translating IPCC communications materials.
- Make embargoed materials (including the approved SPM, press release) available to accredited media to enable them to prepare thoughtful articles in advance of the press conference. Offer embargoed interviews to key media (e.g. wire services).
- Press releases should include key findings of assessments phrased in a way that can be cut and pasted by media.
- This, and production of press materials in general, requires careful cooperation between the Secretariat and Co-chairs/authors coordinated with the approval plenary process.
- Media briefings before and after the launch should explain IPCC processes, starting early in the process, and before the launch explain what is going to be in report (without prejudging exact findings).
- Brief media in a national or regional context.

Derivative products

- Encourage production of derivative products by third parties.
  - Such reports carry a clear disclaimer that they are not endorsed by the IPCC and that responsibility lies with the third party.
  - IPCC authors, co-chairs, Secretariat and TSU staff are encouraged to support these by reviewing for quality control, subject to availability of resources, including derivative products in languages other than English.
  - IPCC authors should be credited for their contribution.

  - Chair/co-chairs should select derivative products for inclusion on the IPCC website, on a third-party outreach page with a clear disclaimer.
  - Hard copies of such selected derivative products may be distributed at IPCC meetings and outreach events etc.
  - Encourage UNEP, WMO and other UN agencies to produce simplified guides (as they did in the past) for posting on their and IPCC websites.
- Help coordinate derivative products from major producers.
  - Consult stakeholders at or around scoping meetings on needs for derivative products.
  - Consider an open call for participation in such meetings; include representatives of groups interested in producing derivative products.
  - Invite stakeholders and those producing derivative products to take part in the development of the report as Expert Reviewers.
  - Organize meetings for them with authors during the review period (Procedures Appendix A 4.3.4.1).

Social media, other communications technology, website

- Investigate how the IPCC could use social media to improve knowledge of its findings and ways of operating and to obtain feedback on its communications and the needs of various stakeholders; review existing social media practice.
- Use professionally produced short video and animations, including graphics, upload in social media and translate (fewer talking heads, more spoken text and images), as resources allow.
- Work with children to produce child-friendly videos (or facilitate production by an appropriate third party).
- Consider videos about authors as a human-interest story explaining their background and research.
- Be aware of the evolving media landscape and the need for global focus, be open to new media in 5 years time, continue to recognize the role of radio (developing countries) and mobile.
- Enhance the IPCC website to make it more user-friendly, accessible and appealing to different audiences, with access to third-party products, and homogenize all websites.
  - Consider an IPCC children's website/portal.

Transparency

- Publish formal drafts of report at the time of review, with appropriate disclaimer (strong recommendation).
  - This requires media capacity (media advisory, co-chairs/authors available to provide context).
- If drafts remain confidential, plan for the inevitable leaks.
  - Recognize leaks will happen and plan for them in existing procedures.
  - Take control of the leak, not by confirming substance but by providing context from approved outlines etc.
  - Rely on relevant external scientists to help frame the response.
- Consider webstreaming and remote participation for some IPCC activities (not all processes should be open).
- Have a clear policy on transparency explaining why not everything is public – be transparent about the fact that there is non-transparency at some stages and explain why these decisions are taken when they are.
- Archive graphics and underlying data for transparency and traceability.

Proposed expert meeting (relevant to clarity, readability, access)

- The science of communicating climate change: including researchers from communications science and IPCC authors to better understand the psychological and technical questions and potential impacts of IPCC messages.
  - This expert meeting should pay special attention to questions of communicating risk and uncertainty.

Annexes

1. Background Information
2. Programme
3. List of Participants
4. Advance Papers
5. Recent Literature
6. Background Documents

Annex 1. Background Information

IPCC Expert Meeting on Communication
Oslo, Norway • 9-10 February 2016

At the 41st Session of the IPCC (IPCC-41) (Nairobi, Kenya, 24-27 February 2015), the Panel decided to organize a meeting with the mandate to share experiences, best practices and lessons learned from communication and outreach around the Fifth Assessment Report, and prepare a report for the 43rd Session. It agreed to include 20 journeys for this meeting in the forecast budget for 2016. The Norwegian Environment Agency (Miljødirektoratet) generously offered to host the meeting in Oslo.

The Acting Chair of the IPCC formed a Steering Committee consisting of the members at the time of the IPCC Communications Action Team (CAT) and external representatives. Its members are:

Former CAT:

- Ismail El Gizouli (former IPCC Acting Chair)
- Jean-Pascal van Ypersele (former IPCC Vice-Chair)
- Melinda Tignor (former Director of Operations, IPCC Working Group I Technical Support Unit (TSU))
- Katie Mach (former Science Director, IPCC Working Group II TSU)
- Patrick Eickemeier (former Head of Communications, IPCC Working Group III TSU)*
- Taka Hiraishi (former Co-Chair, Task Force on National Greenhouse Gas Inventories)*
- Kiyoto Tanabe (Co-Chair, Task Force on National Greenhouse Gas Inventories)**
- Leo Meyer (former Head, IPCC Synthesis Report TSU)
- Bruce Stewart (Acting Secretary, IPCC)***
- Jonathan Lynn (Head of Communications, IPCC)

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* until October 2015
** from October 2015
*** until December 2015

External members:

- Øyvind Christophersen (Norwegian focal point for the IPCC)
- Rabelani Tshikalanke (South Africa Department of Environmental Affairs)
- Enrique Maurtua Konstantinidis (Fundación Ambiente y Recursos Naturales)
- Sussan Joy Hassol (Climate Communication)
- Monica Araya (Nivela)

Observers:

- Carlos Martin-Novella (Deputy Secretary, IPCC)
- Espen Larsen (Norwegian Environment Agency)

The Steering Committee met once in person (in Paris, during the 21st Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change) on 10 December 2015 and 10 times by conference call (21 August 2015, 1 September 2015, 16 October 2015, 27 October 2015, 19 November 2015, 5 January 2016, 12 January 2016, 20 January 2016, 27 January 2016, and 2 February 2016). The focus of these calls was agreeing the dates of the meeting,

finalizing the list to be submitted to the Chair of the IPCC of participants to be invited, and finalizing the goals and agenda of the meeting.

The Expert Meeting was held on 9-10 February 2016 in Oslo. A total of 72 participants attended the meeting, including 49 invited experts, of whom 19 from developing countries/economies in transition had their travel supported by the IPCC. The other participants were 10 from the preparatory Steering Committee (of whom 3 had their travel supported by the IPCC Trust Fund), 8 from the current IPCC Executive Committee and 5 from the Secretariat.

The meeting was chaired by Christian Bjørnæs, Communication Director of the CICERO Center for International Climate and Environmental Research, Oslo, Norway. About half of the meeting was devoted to presentations and about half to discussions in breakout groups on recommendations. A total of 25 advance papers were submitted ahead of the discussions, and can be found in Annex 4 of this report.

The costs of the meeting for the IPCC totaled CHF 77,034, consisting of travel support for invited experts, members of the Steering Committee, members of the current Executive Committee and Secretariat staff.

19 invited experts (developing countries/economies in transition)	CHF 51,611
3 members of the Steering Committee (developing countries/economies in transition)	CHF 8,321
3 eligible members of the Executive Committee	CHF 7,807
5 secretariat staff	CHF 9,248
Miscellaneous	CHF 47

In addition, the Norwegian Environment Agency hosted the meeting, and participants received support from governments and institutions, including the United Nations Framework Convention on Climate Change Secretariat, World Meteorological Organization, governments of Belgium, France, Germany, New Zealand, Norway, Switzerland, United Kingdom and United States, Cambridge Institute for Sustainability Leadership, Carbon Brief, Climate Outreach, European Climate Foundation, Finnish Meteorological Institute, Fordham University, Institute for Global Environmental Strategies, Quaker United Nations Office, Reuters Institute for the Study of Journalism, The B-Team, University of East Anglia, University of Queensland Global Change Institute, World Energy Council, Yale Program on Climate Change Communication, and Yale University.

The presentations covered general questions of communication, the particular constraints facing the IPCC in communications, the experience of communicating AR5 from the perspective of the authors and previous co-chairs, the experience of AR5 outreach from the perspective of governments, other policymakers and civil society organizations, how AR5 was reported by the media, and how other organizations communicate their climate assessments. The breakout groups examined readability, clarity, policy relevance – including the scoping process, use of communications experts, and use of multimedia; derivative products; outreach and communications with different stakeholders; and communicating through the media.

Plenary sessions of the Expert Meeting were webcast and about 500 people followed them. A recording of these can be found at: https://www.youtube.com/playlist?list=PL8HWK0G9m3B6T8SN_B1H4h6rhVlAjEFt4.

Annex 2. Programme

IPCC Expert Meeting on Communication
Oslo, Norway • 9-10 February 2016

Tuesday 9 February
(*08.00-09.00* registration)

1. *09.00-09.15* Formal opening
   Audun Rosland, director of the climate department, Norwegian Environment Agency
   Hoesung Lee, IPCC Chair *(via videoconference)*
   Chair: Christian Bjørnæs

2. *09.15-09.45* IPCC communication issues – constraints and opportunities
   Chair: Christian Bjørnæs
   Presenter: Jonathan Lynn
   Advance paper
   Advance paper on preparations for the release of AR5 and previous reports
   Current IPCC Communications Strategy
   IPCC Communications Strategy Implementation Plan
   AR5 Communications Strategy

3. *09.45-10.30* The AR5 experience – communications lessons from the authors
   Panel discussion with co-chairs and authors from AR5 who describe what worked and what did not in developing the report from a readability and access perspective, identifying key challenges and areas for improvement
   Panelists will be requested to submit brief advance papers, and highlight key points in opening statements of ~5 minutes to initiate the discussion
   Chair: Christian Bjørnæs
   Panelists: Chris Field, Leo Meyer, Pauline Midgley, Youba Sokona
   Advance papers

4. *10.30-11.15* The AR5 experience – lessons from outreach
   Panel discussion with representatives of governments and NGOs on AR5 outreach in developed and developing countries
   Panelists will be requested to submit brief advance papers, and highlight key points in brief opening statements of ~2-3 minutes to initiate the discussion
   Chair: Christian Bjørnæs
   Panelists: Øyvind Christophersen, Hunter Cutting, Jessica Dator-Bercilla, Christiane Textor, Rabelani Tshikalanke, Simbisai Zhanje
   Advance papers

5. *11.15-12.15* World Café (with coffee)
   The context for this discussion is that AR6 will probably appear in 2021/2022. How will we communicate its findings to the teenagers and young people (currently children) who will face the consequences of climate change that AR6 will describe? Already young people today tend not to get their information from conventional media such as newspapers and TV, or from books. The questions will be:
   - How can the IPCC communicate its often dense and technical material not only to policymakers but the wider world, bearing in mind that communications methods are changing fast?
   - What new stakeholder groups can the IPCC reach and how?
   - What new communications products can the IPCC use (including new types of derivative products, or new types of outreach activity)?

Hosts: Monica Araya, Øyvind Christophersen, Enrique Maurtua Konstantinidis, Katie Mach, Asher Minns, Rabelani Tshikalanke, Michael Williams, Mandy Woods, Jean-Pascal van Ypersele
Participants will be allocated to one of nine groups, which will each move between three tables for three sessions of 15 minutes each

6. *12.15-12.45* The JPI Study on Communicating AR5
Chair: Monica Araya
Presenter: James Painter
Respondent: Laura Gallardo
(Panelists from previous sessions encouraged to comment)
Advance paper on JPI study
Advance paper: compilation of recent relevant research and publications

7. *12.45-13.30* Climate communications – other assessments
This will also touch on questions such as training scientists in presentations for non-specialists, and use of photos
Chair: Monica Araya
Presenter: Susan Joy Hassol
Advance paper

8. *13.30-14.30 Lunch*

9. *14.30-17.15* Breakout sessions to develop recommendations for the Panel (coffee available *16.00*):

NB 1: Recommendations should also address specific issues in developing countries.

NB 2 Recommendations should consider any resource implications, and should also consider the communications role of National Focal Points and Technical Support Units.

NB 3: Participants are encouraged to move between groups. If moving between groups, it is recommended to do so at 16.00 on Tuesday and at 11.15 or after lunch on Wednesday.

NB 4: Co-Chairs and rapporteurs will also develop recommendations for updating the IPCC Communications Strategy (and Implementation Plan), with help from participants dedicated to this task. (Pauline Midgley, Rapporteurs for the Communications Strategy for each breakout group).

i. *14.30-15.00* Reports back from World Café by hosts; briefing on role of breakout sessions and participation in different breakout groups
Chair: Christian Bjørnæs

ii. *15.00-17.15* Breakout sessions

A. Recommendations on improving readability, clarity and policy relevance of the IPCC reports (including scoping; use of language experts, science writers, graphics designers; summary for citizens of the world; translation; training on presentations; use of video, animations and graphics)
Co-Chairs: Richard Black, Debra Roberts
Rapporteur: John Cook
Rapporteur for Communications Strategy: Christiane Textor
Participants to include: David Budescu
Advance papers

B. Recommendations on derivative products (including any formal or informal role for the IPCC; development of presentations for non-specialists)
Co-Chairs: Leo Meyer, Simbisai Zhanje
Rapporteur: Joyashree Roy
Rapporteur for Communications Strategy: Youba Sokona
Participants to include: Eliot Whittington
Advance papers

C. Recommendations on communications with stakeholders (including scoping, outreach and social media; stakeholders include children; presentations for non-specialists)
Co-Chairs: Rabelani Tshikalanke, Jean-Pascal van Ypersele
Rapporteur: Jessica Dator-Bercilla
Rapporteur for Communications Strategy: Eduardo Calvo
Participants to include: Andreas Fischlin; Paul Lussier
Advance papers

D. Recommendations on communications with and through media (including communications before a report is finalized, use of external resources, the launch process, media training, transparency of IPCC meetings and activities)
Co-Chairs: Tim Nuthall, Monica Araya
Rapporteur: Heidi Cullen
Rapporteur for Communications Strategy: Ko Barrett
Participants to include: Lance Ignon, Jill Peeters
Advance papers

10. *17.30-18.15* Reports of Day 1 breakout sessions and follow-up discussion
To include some written material or slides
Chair: Christian Bjørnæs

11. *18.15-18.30* Compilation of Day 1 Twitter comments (#IPCCOslo)
Presenter: Nina Peeva

12. *19.00-21.30* Visit to Ski Museum and Holmenkollen ski jump tower with dinner, followed by guided tour in groups and talk about importance of snow to countries like Norway and challenges posed by climate change
Buses will leave the meeting venue at 18.30 and go directly to the museum/ski jump (not via hotels). Transport will be arranged back to the hotels afterwards.

Wednesday 10 February

13. *08.00-09.00* Meeting of breakout group co-chairs and rapporteurs to discuss recommendations for communications strategy

14. *09.00-09.15* Recap of previous day, discussion of cross-cutting issues including social media, training authors, products not approved by the Panel, involvement in third-party products.
Chair: Christian Bjørnæs

15. *09.15-09.45* Tackling misinformation and misconceptions
Chair: Christian Bjørnæs
Presenter: John Cook
Advance paper

16. *09.45-10.30* Beyond the transmission belt – "upstream" communications and stakeholder values
Chair: Christian Bjørnæs
Presenter: Paul Lussier
Respondent: Beth Holland
Advance papers

17. *10.30-12.15* Breakout sessions (as above) (coffee available at 11.00)

18. *12.15-13.45* Lunch
Side event – Children's Panel on Climate Change (Barnas Klimapanelet)
– Presentation by Children's Panel on Climate Change
– Discussion on communicating climate change to young people

19. *13.45-15.15* Breakout sessions contd.

20. *15.15-16.00* Break for rapporteurs to prepare reports

21. *16.00-16.45* Reports of breakout sessions, follow-up discussion (coffee available at 16.00)
    Chair: Christian Bjørnæs
    Rapporteurs: Christine Textor, Joyashree Roy, Jessica Dator-Bercilla, Heidi Cullen, Pauline Midgley

22. *16.45-17.00* Compilation of Day 2 Twitter comments (#IPCCOslo)
    Presenter: Nina Peeva

23. *17.00-17.15 Conclusions and explanation of next steps*
    Presenter: Jonathan Lynn

Annex 3. List of Participants

IPCC Expert Meeting on Communication
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Imelda ALBAÑO
Philippines EnviroNews
PHILIPPINES

Mercedes ANDRADE
National Autonomous University of Mexico
MEXICO

Claudio ANGELO
Observatório do Clima
BRAZIL

Monica ARAYA
Nivela
COSTA RICA

Yunwen BAI
Greenovation Hub
CHINA

Jesbin BAIDYA
IPCC Secretariat

Hoda BARAKA
350.org
EGYPT

Ko BARRET
IPCC Vice-Chair
National Oceanic and Atmospheric Administration
UNITED STATES OF AMERICA

Christian BJØRNÆS
Centre for International Climate and Environment (CICERO)
NORWAY

Richard BLACK
Energy and Climate Intelligence Unit
UNITED KINGDOM

Gabriel BLANCO
Universidad Nacional del Centro
de la Provincia de Buenos Aires
ARGENTINA

David BUDESCU
Fordham University
UNITED STATES OF AMERICA

Eduardo CALVO
Co-Chair: IPCC Task Force on National Greenhouse Gas Inventories
Universidad Nacional Mayor de San Marcos
PERU

Øyvind CHRISTOPHERSEN
Norwegian focal point for the IPCC
Norwegian Environment Agency
NORWAY

Maite CIGARAN
Libélula
PERU

John COOK
University of Queensland
AUSTRALIA

Lindsey Fielder COOK
Quaker United Nations Office
GERMANY

Adam CORNER
Climate Outreach
UNITED KINGDOM

Heidi CULLEN
Climate Central
UNITED STATES OF AMERICA

Hunter CUTTING
Climate Nexus
UNITED STATES OF AMERICA

Jessica DATOR-BERCILLA
Christian Aid
PHILIPPINES

Suraje DESSAI
University of Leeds
UNITED KINGDOM

Ahmed DJOGHLAF
Co-Chair: Ad-hoc group on the Durban Platform, United Nations Framework Convention on Climate Change
ALGERIA

Surveyor EFIK
Climate Change Network Nigeria
NIGERIA

Argelia FERNÁNDEZ
Environment Cuba
CUBA

Chris FIELD
Co-Chair: IPCC AR5 Working Group II
Carnegie Department of Global Ecology
UNITED STATES OF AMERICA

Andreas FISCHLIN
Vice-Chair: IPCC Working Group II
ETH Zurich
SWITZERLAND

Jan FUGLESTVEDT
Vice-Chair: IPCC Working Group I
CICERO - Centre for International Climate and Environmental Research - Oslo
NORWAY

Laura GALLARDO
Universidad de Chile
CHILE

Evelyne GBE DEBA
United Nations Environmental, Scientific and Cultural Organisation
COTE D'IVOIRE

David HANSFORD
Writer, Editor, Blogger and Photographer
NEW ZEALAND

Susan Joy HASSOL
Climate Communication
UNITED STATES OF AMERICA

Beth HOLLAND
Pacific Centre for Environment and Sustainable Development
FIJI

Lance IGNON
IPCC Secretariat

Enrique Maurtua KONSTANTINIDIS
Fundación Ambiente y Recursos Naturales
ARGENTINA

Nina KUKKURAINEN
Finnish Meteorological Institute
FINLAND

Espen LARSEN
Norwegian Environment Agency
NORWAY

Hoesung LEE
IPCC Chair
University of Korea
REPUBLIC OF KOREA

Anthony LEISEROWITZ
Yale Programme on Climate Change Communication
UNITED STATES OF AMERICA

Paul LUSSIER
Yale University
UNITED STATES OF AMERICA

Jonathan LYNN
IPCC Secretariat

Katie MACH
Head of Science: Technical Support Unit, IPCC AR5 Working Group II
Carnegie Department of Global Ecology
UNITED STATES OF AMERICA

Valérie MASSON-DELMOTTE
Co-Chair: IPCC Working Group I
University of Paris-Saclay
FRANCE

Leo MEYER
Head: Technical Support Unit, IPCC AR5 Synthesis Report
THE NETHERLANDS

Pauline MIDGLEY
Head: Technical Support Unit, IPCC AR5 Working Group I
GERMANY

Asher MINNS
Tyndall Centre UEA and Future Earth Europe
UNITED KINGDOM

Paul MONARE
South African Broadcasting Corporation
SOUTH AFRICA

Stuart NEIL
World Energy Council
UNITED KINGDOM

Tim NUTHALL
European Climate Foundation
BELGIUM

Nick NUTTALL
United Nations Framework Convention on Climate Change (UNFCCC)

James PAINTER
Reuters Institute for the Study of Journalism
UNITED KINGDOM

Jill PEETERS
VTM News
BELGIUM

Nina PEEVA
IPCC Secretariat

Roz PIDCOCK
Carbon Brief
UNITED KINGDOM

Hans Otto PÖRTNER
Co-Chair: IPCC Working Group II
University of Bremen
GERMANY

Debra ROBERTS
Co-Chair: IPCC Working Group II
EThekwini Municipality
SOUTH AFRICA

Joyashree ROY
Jadavpur University
INDIA

Jim SKEA
Co-Chair: IPCC Working Group III
Imperial College London
UNITED KINGDOM

Youba SOKONA
IPCC Vice-Chair
The South Centre
SWITZERLAND

Per Espen STOKNES
Norwegian Business School
NORWAY

Kiyoto TANABE
Co-Chair: IPCC Task Force on National Greenhouse Gas Inventories
Institute for Global Environmental Strategies
JAPAN

Christiane TEXTOR
German IPCC Coordination Office
GERMANY

Melinda TIGNOR
Head: Technical Support Unit, IPCC Working Group II
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Rabelani TSHIKALANKE
South Africa Department of Environmental Affairs
SOUTH AFRICA

Keith TUFLEY
The B Team
SWIZERLAND

Eliot WHITTINGTON
Cambridge Institute of Sustainability Leadership
UNITED KINGDOM

Michael WILLIAMS
World Meteorological Organization

Mandy WOODS
WWF International Global Climate and Energy Initiative
SOUTH AFRICA

Xueyan YANG
Beijing Foreign Studies University
CHINA

Jean-Pascal van YPERSELE
IPCC AR5 Vice-Chair
Université catholique de Louvain
BELGIUM

Werani ZABULA
IPCC Secretariat

Simbisai ZHANJE
SouthSouthNorth
SOUTH AFRICA

Annex 4. Advance Papers

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Advance paper 1 - IPCC communications issues - constraints and opportunities
J. Lynn

Advance paper 2 - IPCC Communications: Experiences from the AR5
C. Field, *K. Mach*, *Y. Sokona* and *T. Stocker*

Advance paper 3 - Communicating the science of climate change mitigation: AR5 experiences from Working Group III
Y. Sokona, *O. Edenhofer*, *R. Pichs-Madruga*, *P. Eickemeier* and *J. Minx*

Advance paper 4 - Preparations for the release of AR5 and previous reports
J. Lynn

Advance paper 5 - AR5 outreach and communications in Norway, 2012-2015
Ø. Christophersen

Advance paper 6 - AR5 Outreach in developing countries – Africa's perspective on the IPCC
R. Tshikalanke

Advance paper 7 - Advance Paper on Communication in the U.S. National Climate Assessment (2014)
S.J. Hassol

Advance paper 8 - Creating climate science visuals that are accessible and scientifically accurate
J. Harold, *K.R Coventry*, *I. Lorenzoni*, and *T.F Shipley*

Advance paper 9 - Communication and outreach on climate change
M. Andrade

Advance paper 10 - Exploring trans-disciplinary approaches to communicating the IPCC Assessment Reports
J.A. Dator-Bercilla, *A. Yulo-Loyzaga*, *R.T Perez* and *E. Porio*

Advance paper 11 - Improving communication of uncertainty in the IPCC reports
D.V. Budescu

Advance paper 12 - IPCC communications - loose thoughts from a heavy user
C. Angelo

Advance paper 13 - Linguistic analysis of IPCC summaries for policymakers and associated coverage
R. Barkemeyer, *S. Dessai*, *B. Monge-Sanz*, *B.G. Renzi* and *G. Napolitano*

Advance paper 14 - A new science-policy interface: The Structured Expert Dialogue of the 2013-2015 review of the UNFCCC
A. Fischlin

Advance paper 15 - New strategies in science communications
P. Lussier

Advance paper 16 - Outreach activities related to the IPCC AR5 in Germany
C. Textor

Advance paper 17 - Seven recommendations for improving IPCC communication and policy impact
A.L. St.Clair, *J. Painter*, *E. Hermansen*, and *C. Bjørnæs*

Advance paper 18 - Some ideas
J. Peeters, weather presenter, Belgium

Advance paper 19 - Submission from the Quaker United Nations Office
L. F. Cook

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Advance paper 1

IPCC communications issues – constraints and opportunities

Jonathan Lynn

The IPCC has encountered criticism from users, including policymakers – its main target audience – and from communications experts that its reports are hard to understand and navigate. Its language is full of jargon, conclusions are hedged about with diplomatic and scientific reservations, and the reports do not always address the priorities of stakeholders.

In responding to this criticism, the IPCC faces many constraints. Some are common to any organization trying to communicate science to various non-specialists. Others arise from the unique nature and function of the IPCC.

General challenges in communicating science

- The science relating to climate change, encompassing a wide range of disciplines, is often complicated. Complex findings cannot always be simplified for communication purposes without distorting them or sacrificing precision.
- Scientists are trained to describe their findings by marshalling large amounts of evidence and building to a conclusion. This is the opposite to communication in media, which in its simplest form starts with a conclusion, supports it with context and one or a few outstanding pieces of evidence and backs it with interpretation that is often emotional or colourful. Many people are used to receiving information the media way.
- Science is rarely 100% certain, and to be accurate many scientists need to communicate the uncertainty associated with their findings. Even if the probability of an outcome is highly relevant to policymaking, the communication of uncertainty can mask the clarity of a finding for policymakers and the public.

Still, other scientific bodies manage to overcome these obstacles, and there seems no reason why with effort and good will, IPCC scientists cannot work with people with communications expertise to do so too.

Consider then the problems specific to the IPCC, arising from its unique nature.

What is the IPCC?

- The IPCC was set up in 1988 to tell policymakers what we know, and what we don't know, about climate change, its impacts, possible future risks, and potential solutions to tackling it.
- It is an assessment body. It does not conduct its own research or measure data. It can only cover a topic if there is already a body of research on it.
- It is policy-relevant without being policy-prescriptive. It does not campaign or advocate particular actions, though it may lay out policy options.
- This policy-neutrality underpins the IPCC's credibility, and so a perceived departure from objectivity could undermine that credibility.
- IPCC reports rely on time and expertise volunteered by its authors and elected officials. Even if many IPCC scientists, especially in developed countries, are supported e.g. in terms of time by their home institutions, the volunteer nature of the organization creates a capacity constraint.
- The IPCC is a partnership between the governments that set the rules and endorse the reports, and the scientists that write the reports.
- The Summary for Policymakers, which is the part of the report that receives most attention from non-specialists, is edited in a dialogue between representatives of the governments that requested the report and will use it and the scientists that drafted it. Editing changes sought by governments must meet a consensus of all governments present, and be endorsed by the scientists as scientifically accurate and in line with the underlying full report.
- While scientists have the last word in this discussion, the language of the Summary for Policymakers is vulnerable to editing that adds ambiguity in the interests of diplomatic compromise. Otherwise the approval

process generally strengthens the clarity and consistency with the underlying report of the Summary for Policymakers.

- Because the findings of the IPCC, as contained in a Summary for Policymakers, are presented after undergoing this formal approval process, it is impossible for the IPCC to comment spontaneously on scientific matters after a report is released, although authors and elected officials can do so as experts in their own right.
- The status of this approved language in the Summary for Policymakers makes it difficult for the IPCC to issue official versions of the report in simpler language targeting different stakeholders, as such versions may not be supported by some member states.
- As presently constituted, and confirmed for the Sixth Assessment Report cycle, the IPCC includes three working groups, each of which issues its own contribution to an assessment report separately, before the findings are integrated into a Synthesis Report. This means that the problems of climate change may be presented months before the potential solutions.

It will be seen from the above that efforts by the IPCC to communicate more clearly or deliver more direct messages to policymakers risk compromising the accuracy of the science of the organization's credibility, and may be opposed by some members.

And the opportunities?

Despite the criticisms about clarity and access, the IPCC's reputation as the gold standard for the science related to climate change is stronger than ever. The IPCC's reports were one of the key inputs into the Paris Agreement.

The criticisms are in fact positive – stakeholders want to engage more closely with the IPCC's work. This conference will explore how we can overcome the obstacles to realise the opportunities.

Advance paper 2

IPCC Communications: Experiences from the AR5

Chris Field, Katharine Mach, Youba Sokona, Thomas Stocker

The AR5 saw a substantial increase in commitment to effective IPCC communications. New investments included features of the IPCC reports designed to increase accessibility, IPCC-produced outreach products, and sophisticated partnerships with other organizations. Some of the new or enhanced investments were introduced by individual working groups. Others came from the upgraded profile of communications within the management of the IPCC, including both the development of a comprehensive communications strategy and the prominent role of a head of communications and media relations.

Overall, the AR5 experience with increased emphasis on broad communication was successful, though not yet transformative. While it is hard to be confident in cause and effect, we are convinced that improved IPCC communications played an important role in shaping the science narrative that shifted emphasis away from responding to challenges from sceptics and toward enabling the strong agreement from COP21. The success of the Paris Agreement has many contributors beyond the effectiveness of IPCC communications. Still, it is notable that major keystones in the Paris Agreement come directly from the AR5. The urgency of mitigation to limit climate change, implied by the finite anthropogenic carbon budget (from WGI), a strong long-term goal (from WGII), and substantial near-term emissions reductions (from WGIII) are now fundamental features of the climate-change landscape. To the extent that there are still criticisms of IPCC communications, they were mostly from the perspective that still more can be done, especially in the areas of making SPMs easier to read and further emphasizing communications investments that go beyond the reports.

Throughout the AR5, effective communications was a topic of almost constant discussion. Most of the early emphasis of the Working Group and Executive Committee (ExCom) leadership was on dealing with attacks on the IPCC during 2009 and 2010. This was a period when negative media coverage was pervasive. Most of the attention focused on accusations of scientific misbehaviour (in the SAR, TAR, and AR4) based on emails stolen from an archive at the University of East Anglia and on accusations of unwarranted alarmism in the AR4, especially with the error related to Himalayan glaciers. While most of the attacks were groundless, irrelevant, or minor, they spiraled into a torrent of negative stories and, to put it mildly, widespread questions about the motivations, integrity, and quality control in the IPCC.

The attacks of 2009 and 2010 caught the IPCC deeply unprepared. The absence of a sophisticated communications strategy resulted in responses that were sometimes constructive but at other times slow or unhelpful. A number of misconceptions were amplified in a media echo chamber. The shortage of effective objective reporting partly reflected limited investments by the IPCC in engaging with journalists. The attacks encouraged the IPCC to engage communications professionals to assist with both strategy and tactics. While those experiences were mixed, especially where they concerned responsiveness of the IPCC, that period established an institutional recognition of the value of a sophisticated, professional communications enterprise. This was ultimately triggered by a push for external review and reform that came out of the IPCC Working Groups. The recognition for the need for improved communications was cemented in the recommendations of the 2010 review of the IPCC conducted by the InterAcademy Council. Positive, durable lessons from the interactions with communications professionals led to an increased willingness, in the IPCC leadership, to commit to media training and to engage more actively and constructively with reporters. These lessons, at the start of the AR5 cycle, had a strong influence on the IPCC communications strategy through the end of the AR5.

At the conclusion of the AR5 cycle, this commitment to engaging constructively with media was an established and hugely constructive element of IPCC communications. Many authors had at least one, and for many individuals several, sessions of media training. Responses to media were generally quick and thoughtful.

Below, we structure the presentation of IPCC communications in the AR5 around (1) changes to reports, (2) introduction of IPCC-produced outreach products, and (3) working through partnerships with other organizations.

1. Changes to reports

Structurally, the AR5 reports are quite similar to those from previous cycles. But they differ in several important respects. First, all of the reports (SRREN, SREX, the three WG reports, and the SYR), have an overall structure and narrative intended to reflect increased attention on effective communication. Second, all of the reports benefitted from a consistent design, layout, and graphical style. Many of the most important changes were in the SPMs, which introduced the headline statements (WGI), strong conceptual figures (in WGII), and simple graphical representations of important findings.

The headline statements introduced in the WGI SPM, and then adopted for the SPM of the Synthesis Report, provided in simple and accessible language a complete narrative of the entire SPM. The headline statements, approved language by the governments, could be lifted from the SPM and represented the final distillate of the scientific assessment. As such this proved to be a very effective communication tool. Simple affirmations such as "Human influence on the climate system is clear, and recent greenhouse gas emissions are the highest in history" or "Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions, and together with adaptation, can limit climate risks", are examples from headline statements in the Synthesis Report.

Some of the most memorable features of the AR5 are the strong, clear figures. Notable examples are the risk "propeller" figure in SREX (Figure SPM.1), the observed warming in WGI (Figure SPM.1b), the technical potential figure in SRREN (Figure SPM.4), the cumulative emissions figure in WGI (Figure SPM.10), the observed impacts map in WGII (figure SPM.2), the regional key risk table in WGII (Box SPM.2, Table 1), and the "grand synthesis" in the SYR (Figure SPM.10). Each of these conceptual and data figures reflects a large investment in thinking about, testing, evaluating, and refining for clarity. To a much greater extent than in earlier assessments, these figures demonstrate an emphasis on clarity that did not compromise accuracy and scientific information content.

Careful wording, chosen to emphasize clarity and communicate effectively, was a priority across the AR5, though with different manifestations and levels of ambition across the components. In WGI, the focus was on a series of headline statements each consistently summarizing the subsections and sections of the WGI SPM. WGII placed more emphasis on the clarity and communications impact of individual findings. The characterization of the risks of climate change impacts that are "severe, pervasive, and irreversible" creates a defining phrase and a lasting memory. WGIII embedded the goal of effective communications in the way it framed the issues in the report and through the perspectives of the author team, especially concerning topics that are intrinsically value-laden.

2. IPCC-produced outreach products

The AR5 hosted a large expansion in the range of IPCC-produced outreach products. Most of these were initiated for the SREX through very effective partnership that involved additional funding from the government of Norway, support from the UK Climate and Development Knowledge Network (CDKN), and WGII. Strong commitment from the government of Norway and deep involvement of several of the individuals representing it was critical for the success of this effort.

New products introduced in the SREX roll-out included a professionally produced website, video, and slide deck, all developed in close collaboration with the WGII and WGI TSUs and authors to assure accuracy. In addition, the SREX roll out involved an international series of outreach meetings, designed to connect academics, practitioners, NGOs, the private sector, youth organizations, and governments with the scientific conclusions. In addition, the SREX release involved the IPCC's first experiment with an early embargoed release of the SPM to professional media.

These elements, first road-tested with SREX, were all very successful. All were integrated into the IPCC communications strategy and further developed with the release of the AR5 WG and SYR reports.

A few additional products came to maturity with the release of the later reports. These included separate printing of fact sheets, FAQs, the WGI headline statements, the WGII top-level findings, and regional climate and key-risk summaries, plus the translation and printing of several WGII executive summaries into regional languages, including Swahili.

3. The role of partnerships with other organizations

One of the major realizations in the development of the AR5 communications strategy was the importance of going beyond the IPCC for relevant expertise in communicating scientific results. The first experiences were with communications professionals who provided assistance in responding to the attacks of 2009 and 2010. Some of these were hired through Working Groups. Others were hired independently. Some of the communications assistance came from organizations that donated expertise. The absence of reliable funding mechanisms through the IPCC secretariat was a source of consequential stumbling blocks early in the process.

For SREX, funding from the government of Norway facilitated the engagement of professionals to assist with the website, video, and slide deck. The government of Norway also played an essential role in supporting travel by IPCC authors as well as stakeholders/participants. In kind funding from CDKN was essential in organizing international outreach events. Volunteer contributions by many SREX authors were the final critical element for successful outreach.

Funding from the Villum Foundation supported much of the communications and outreach for the AR5 WG and SYR reports. Management of the funds by the UN Foundation provided a professional communications interface to support a wide range of activities. These included both personal consultation about communications issues and replication and extension of the SREX innovations. One of the most important extensions was the deployment, initially for WGII releases, of a roll-out strategy that included a carefully managed embargo, an extensive set of coordinated interviews, and deployment of a satellite studio at the approval venue.

Concluding thought

During the AR5, the IPCC transitioned from viewing communication as a bother and risk to seeing it as an essential component of delivering on its mandate. The process of making the transition involved some components that were reactive, deployed in crisis-management mode, and others that were proactive. The emergence of a sophisticated communications enterprise is a work in progress, with many elements that are experimental. Many components of the vision are not yet complete. This reflects the still uneven appreciation, among countries, of the value of communications and the challenge of building a deployment under the complicated operating procedures of the IPCC. For future reports, an even greater emphasis on sophisticated, ambitious communication will be a prerequisite for success.

Advance paper 3

Communicating the science of climate change mitigation: AR5 experiences from Working Group III

Youba Sokona, Ottmar Edenhofer, Ramon Pichs-Madruga, Patrick Eickemeier and Jan Minx

The world has just agreed on a new international climate agreement in Paris at COP21. It is remarkable how well the text of the Paris Agreement and decision aligns with the current science of climate change – this is a major achievement of the long-standing dialogue between scientists and policymakers within the Intergovernmental Panel on Climate Change (IPCC) as well as the United Nations Framework Convention on Climate Change (UNFCCC). As representatives and contributors of Working Group III in AR5, we see a series of key messages on mitigation from the report well reflected in the text. This pertains to statements about the long-term goal, pathways to a full decarbonization and near-term emission reductions among multiple others. It is also remarkable that knowledge gaps identified in WGIII AR5 directly found their way into the Paris documents such as the lack of comprehensive science on mitigation pathways that limit warming to 1.5°C relative to pre-industrial levels. Some recent commentaries have correctly highlighted considerable scope for improvements in IPCC communications (1, 2), but we also feel that a series of innovations in IPCC communications have added up during AR5 and put the organization on a good track into the future.

A bumpy start into the AR5 cycle

The new communication developments that came into life during AR5 are not all related to, but would not have materialized without the communications crisis in 2009/2010 when severe allegations were made about the integrity of the science and the ability of the IPCC to identify and correct errors in its reports. This triggered new resources, procedural reform and the required awareness that allowed the IPCC as an organization to professionalize further in the field of communications. At the root of this reform process was the insight by IPCC leadership that a comprehensive external review – ultimately carried out by the Interacademy Council – would be required to guide a reform process that would strengthen the organization for the future. For communications this included hiring an experienced communications manager in the IPCC Secretariat to coordinate activities across the institution, the development of a Communication Strategy that identifies and clarifies responsibilities, but also procedural additions like the Error Protocol for dealing with potential errors in IPCC products. Working Group III along with other IPCC leadership, the Panel, the Bureau, the Technical Support Units, authors and many external collaborators have made their contribution to professionalizing IPCC communications throughout AR5. Here, we focus on Working Group III activities in the area of communication along the lines of two questions: 1) How to adequately communicate at the science-policy interface? 2) What were key activities to ensure effective communication and outreach?

Communication at the science-policy interface

The IPCC is a unique institution at the science-policy interface. To secure its integrity in the long run the question of how to communicate results best also requires deeper thoughts on the adequate division of labour between science and policy. We believe that this is a question of utmost importance that should be given the required attention in future IPCC communication exercises. Ultimately, the key issue at the science-policy interface is the entanglement between scientific facts and values and its implications for assessment-making. Clarifying this issue and developing a common understanding among IPCC leadership and author teams is the basis for an adequate science communication – particularly in solution-oriented assessments that are deeply rooted in the social sciences. Working Group III spent a lot of effort in understanding the issue and its implications, which is documented in a series of publications (3, 4), and briefly outlined in the WGIII AR5 preface (5).

In order to be policy-relevant without being policy-prescriptive, Working Group III set out to explore the solution space of climate policy by characterizing alternative mitigation pathways and goals in terms of their technological, economic and institutional requirements. Scientists act as cartographers that provide knowledge maps to policymakers as the navigators who consider this information in the decision-making process. As any map needs a legend, adequate IPCC communications also need to be transparent about the value assumptions underpinning the science. Overall, this pathway cartography metaphor has been central to communicating mitigation science in the following way:

- *Structure of the report and its summaries:* The Working Group III report has been structured to establish increased transparency over concepts and methods and their underlying values and world views. For this purpose comprehensive framing chapters have been invented that are mirrored by introductory framing sections in the Technical Summary and the Summary for Policymakers. Even though this may not seem to be of immediate concern for IPCC outreach activities, we believe that it is right at its core. Increasingly solution-oriented IPCC assessments will depend on this transparency – without it, the integrity of the organization will be at stake.
- *Internal communication*: There has been a heavy investment throughout the AR5 cycle to establish a shared understanding among authors of the WGIII approach to assessment-making. This was directly relevant for the way the report was written and later on communicated by Working Group III authors.
- *External communication*: The Working Group III approach to assessment-making itself was also subject of communication activities to explain the role, purpose and workings of assessment bodies like the IPCC.
- *Author selection:* Balanced communication through IPCC products requires involvement of diverse groups of experts from relevant fields. For example, it was a novelty in the Working Group III report for the IPCC to involve philosophers in AR5. This has been an effective way to establish transparency over alternative concepts of justice, responsibility or value that are at the core of climate change mitigation.

Preparing for effective communications

Working Group III has also initiated and been part of many other hands-on activities to improve IPCC communications and outreach:

- *Shaping a series of plain and understandable key messages in line with the available science*: Working Group III invested serious effort into providing plain messaging throughout the report acknowledging the various constraints within the IPCC process to do so. A series of measures were then taken to make key messages more accessible to a broad audience in communication and outreach efforts. These are described in this section below. Overall, we feel that a series of key messages from AR5 penetrated and have become guiding narratives of the climate change mitigation discourse. Among others these are:
  - Climate policies are an exercise in risk management and need to be framed in a broader context of sustainable development.
  - Greenhouse gases are growing faster than previously despite efforts to curb emissions.
  - It is technically and economically possible to halt global warming and to keep the increase of the global mean temperature below 2° Celsius. Achievement hinges on the building of effective, global institutions.
  - The science of mitigation shows that the longer we wait, the more costly and the more risky mitigation will become.
  - Mitigation in line with the 2°C target increasingly depends on the ability to remove carbon dioxide from the atmosphere.
  - Mitigation action can realize co-benefits for other sustainability goals like reduction of local air pollution and poverty.
- *Building in-house communication capacity*: Working Group III TSU hired a communication manager with a long-standing experience in climate change communications. This was important for organizing Working Group III communications and contributing to IPCC-wide communication activities as well as the development of the IPCC communication strategy. Above all, this helped to translate the key messages from WGIII AR5 into plain language during outreach activities (see below).
- *Developing a common and contemporary design for IPCC products*: WGIII lead the process of establishing a professional, corporate design for the AR5 products.
- *Professional figure development*: All Working Group III figures were produced by a professional graphic designer. This did not only contribute to the professional look of the final publications, but also helped in accessibility of the figures and their usability for presentations and derivative publications.
- *Focused outreach plan*: Working Group III developed a focused outreach plan around the approval plenaries as well as the Structured Expert Dialogue within the UNFCCC. While many other fora were targeted by

WGIII outreach efforts, the targeted approach to communication enabled an efficient knowledge transfer of often highly complex information at two essential points: the publication of the report as the moment of greatest public attention, and the ongoing dialogue with policymakers in the UNFCCC process as the key audience of IPCC reports.

- *Additional outreach materials*: Like other Working Groups, a series of additional outreach materials were generated including factsheets, comprehensive presentation materials, and summary volumes. Working Group III also contributed to the translations of SPMs into other languages including non-UN ones. Working Group III further developed simplified versions of report figures that were tailored to outreach purposes, i.e. the simple and effective communication of the main messages of the report. This was crucial as the language in IPCC summaries can be challenging at times (2). Once made available, those slides were greatly in demand by WGIII leadership, IPCC authors as well as the general public providing the basis for conveying the report's key messages around the globe.
- *Collaboration in the production of derivative products*: Through organizations such as the focal points of Norway and Germany, and various NGOs WGIII cooperated with communications specialists outside of the IPCC to support other organizations spreading key messages from the report to different stakeholder groups.

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Advance paper 4

Preparations for the release of AR5 and previous reports

Jonathan Lynn

The Fifth Assessment Report (AR5) saw a number of innovations for the IPCC in communication.

Release of the report

Press release

IPCC press releases for reports were only introduced in the AR5 cycle, for the Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN) and the Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). Previously press releases were issued on behalf of the IPCC by the parent organizations World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP).

This approach was bedded down for AR5, in line with the communications strategy, under which the co-chairs are responsible for the content of a respective working group's report, and the chair for the Synthesis Report. The co-chairs drafted press releases that were edited by the communications team from the perspective of communications and media, not content. Press releases were revised at the last minute to reflect changes to the Summary for Policymakers (SPM) in approval.

Embargo

Each working group report SPM and the Synthesis Report, and press release, were made available under embargo to media, to allow them to prepare articles. For Working Group I, texts were provided to media present at the press conference a few hours in advance; for the other working groups and Synthesis Report they were made available electronically to registered media the previous day. This was tested with the release of the full SREX, and was welcomed by media. For Working Groups II and III and the Synthesis Report, some advance briefings were conducted, also under embargo, with key media, either individually or in national groups.

Press conferences

Press conferences were streamed live, and the recordings posted soon after (though with some delays in some cases). In practice there was insufficient time to prepare with the respective co-chairs/chair. Facilities included power cables and audio sockets for media, and working space for media afterwards.

Interviews

The respective co-chairs or chair identified authors present at the approval plenary or who would have returned home who could take a lead on interviews. Most of these underwent media training. The list of authors with specialization, language and country was circulated to media, who bid for interviews. Schedules were drawn up allowing dozens of interviews to take place. Space was reserved at the approval plenary location so that interviews, including telephone interviews, could take place simultaneously. Local support staff brought media to authors to ensure the schedules were adhered to and not disrupted by impromptu approaches to authors. Support staff in other centres organized interviews with local authors. A process for booking and facilitating interviews for the subsequent day or days was put in place.

Broadcasters

Broadcasters were offered "B-roll" from the opening session of the approval plenary, and from recent author meetings. Arrangements for the press conference and interviews included parking and cabling for satellite trucks. For Working Group II we built a studio for broadcasters to conduct interviews; for Working Group III and the Synthesis Report we arranged with a firm providing satellite links through their own truck to forward requests from broadcasters to them, and underwrite their costs.

Full report release

A press conference for the release of the full SREX report attracted media interest, despite scepticism that media would report on it following the SPM release half a year earlier. In contrast to earlier reports, the full AR5 working group draft reports were released only a working day or so after the SPM (for Working Group II on the same day) instead of the published report several months later.

Staffing

The IPCC communications team was augmented in the run-up to releases by expert and professional consultants and volunteers provided by foundations, under a memorandum of understanding with the United Nations Foundation.

Leaks

The IPCC moved from a simple "no comment" on leaks of draft reports, to short statements and in some cases comments by co-chairs or authors.

Video

Videos were produced for each working group report and the Synthesis Report, with a professional video maker. As with press releases, content was fully under the control of the co-chairs or chair, with the producer providing technical advice.

Outreach

Outreach events were held in many countries following the release of the working Group reports. Following the release of the Synthesis Report, and thanks to the generosity of several member states, an enhanced AR5 outreach programme was organized to present AR5 findings with partners in Kenya, Tanzania, Pakistan, India, France, Morocco, Thailand, Mexico, Nicaragua, Argentina, Turkey, Russia, Vietnam and the United States, supporting travel for many participants with the country or sub-regionally. Other outreach events were held in Japan, Italy, Ethiopia, Republic of Korea, Switzerland, Germany, France, Cuba, Australia, Norway, United Kingdom, Vatican, Croatia and Zimbabwe, among others. It is hoped to continue this in 2016.

SREX

The Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) was launched during the IPCC session in Kampala, Uganda 18-19 November 2011 This included a webcast press conference and an SREX website[†] with the SPM, press release, fact sheet, presentation, video In Harm's Way, information on the authors and Review Editors, the IPCC process, and other materials. Key authors underwent media training prior to the launch.

The full report of the SREX was launched electronically 28 March 2012. The launch included a "virtual" press conference i.e. a teleconference open to media around the world. The full report was made available to journalists two days before under embargo. This met a long-standing wish of media, and benefited the IPCC by giving reporters enough time to produce well-researched and considered articles. Presentation-quality JPEGs of all SREX figures and tables where provided.

At the same time, the review drafts and comments archive was made available.

By the end of April 2012, there were more than 25,000 downloads of the full SREX report and more than 65,000 downloads of the SPM.

These activities were complemented by a continuing wide-ranging programme of outreach, targeting mainly policy-makers and the disaster risk management community, but also open to the media, in a number of countries.

An outreach programme targeted to developing countries with partners including Norwegian agencies and CDKN resulted in eight regional events in 2012/13 in Cuba, China, India, Thailand, Ethiopia, Senegal, South Africa and Brazil. Several events were heavily oversubscribed. As part of the programme CDKN produced regionally specific materials based on SREX in English, Chinese, French, Spanish and Portuguese.

[†] The report can also be accessed at http://www.ipcc.ch/report/srex/

Advance paper 5

AR5 Outreach and Communications in Norway, 2012-2015

Ø. Christophersen

In brief:

With limited financial resources, but with extensive co-operation among Norwegian IPCC authors' institutions and the focal point (Norwegian Environment Agency) and a good number of working hours from all those involved, both decision-makers and the general public were informed about the key messages from all volumes of the Fifth Assessment Report.

What we did

- Late autumn 2012: Focal point (Norwegian Environment Agency) invites all national IPCC AR5 authors and communications staff from their institutions to a brainstorming meeting.
- Early 2013: Meeting held at focal point premises. Exchange of ideas on how to reach out and issues that could be difficult to communicate. Among challenges that were identified: The new scenarios (RCPs) could create confusion and the apparent pause in temperature rise (1998-2012). Agreement on setting up a communications group with focal point and authors' institutions to prepare WGI launch in September 2013. Focal point provided some financial support to a European network of climate change communicators (ECCO) to make a factsheet in plain language, explaining the RCPs. The fact sheet was finished and published in August 2013, contributing greatly towards a shared understanding of the RCPs and how to talk about them.
- September 13, 2013: WGI communications group organized a seminar for journalists, politicians, climate professionals and decision-makers to prepare them for the WGI launch. Five Norwegian authors who were to present the report September 27, also held presentations at the preparatory seminar. 150 people attended and the seminar was broadcast via the web, followed by several hundred people. Focal point and authors talked about the IPCC and its mandate, the three parts of the AR5 and the list of content of WGI, spoke generally about issues that will be discussed in WGI and explained the difference in the set-up of the RCPs compared to the previous scenarios – all without revealing any numbers/facts/findings from the report. We handed out the fact sheet on RCPs and a fact sheet on WGI in (based on the official IPCC fact sheet), both in Norwegian language.
- September 27, 2013: Launch of report with four Norwegian IPCC authors held at the focal point premises, with the Minister of Environment and 150 people from policy/politics, NGOs, business, government, media etc. present. The event was held in parallel with the launch in Stockholm, and we showed the start of the press conference in Stockholm at the beginning of the national launch. With the help of our national delegation in Stockholm, we managed to produce (in the early morning) a news release and fact sheet in Norwegian about the main findings of WGI that were published as soon as the SPM was published in the IPCC web site. The focal point and the authors' institutions published a total of seven fact sheets in Norwegian that morning, having prepared them over the previous two months. (See list of fact sheets in the Appendix.) All materials, including the live web-streaming, were published on the Environment Agency web site. This resulted in extensive, informative and correct media coverage of the report in Norway – and no questions about the RCPs or the apparent pause in temperature rise.
- November 5 and 6, 2013: In connection with the annual Zero Conference on Climate Change in Oslo, that attracts more than 1000 stakeholders, we co-operated with the organizer to have Thomas Stocker speak the opening day in the plenary. The second day, the focal point co-ordinated and financed a full day "in-depth" seminar on WGI, where Thomas Stocker also participated. About 200 people attended, making it one of the most popular parallel sessions of the Zero conference. Again, the event was streamed live via the web with several hundred followers.

The same "routine", with communications and outreach co-operation among authors' institutions and the focal point, preparatory seminars, national launches parallel in time with the international launch, web streaming and in-depth seminars following the launch, was repeated for WGII, WGIII and SYR – although with fewer fact sheets, and the prep-seminars and in-depth seminars for WGII and WGIII where held together due to the close proximity of launch dates.

The official IPCC videos was translated to Norwegian and published in parallel with the IPCC launches.

Results

- Very useful dialogue among Norwegian authors of all WGs and the focal point, great working relations without compromising authors' scientific integrity.
- By working together and joining forces, outreach and communications became more powerful and holistic than it would have been with no co-ordination and team effort.
- Each event attended by 100-200 people with 500 – 1500 people following the live stream
- IPCC videos in Norwegian translation seen by 30-50,000 people
- Since AR5, there's been no real discussion in Norway about whether climate change is manmade, real and serious. Now the focus is on how to deal with the challenges. We believe the concentrated and shared effort on communicating AR5 contributed to this change in public discourse.

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Appendix – List of fact sheets Published in Norwegian as PDF and HTML-pages on NEA website:

WGI:

- A brief summary of WGI findings
- WGI in numbers and facts
- What are the RCPs?
- How the IPCC uses uncertainty terminology
- The Polar regions in the climate system
- Climate change in Norway until today
- Future climate change in Norway
- Which future do we choose?
- Observed global climate change

WGII:

- WGII in numbers and facts
- A brief summary of WGII findings
- Examples of adaptation measures
- Possible effects of climate change on society in Northers Europe in 2050

WGIII:

- A brief summary of WGIII findings
- WGIII in numbers and facts

SYR:

- Brief summary of synthesis report
- Examples of adaptation and mitigation measures
- A changing climate – a quick guide to the IPCC Fifth Assessment Report

Advance paper 6

AR5 Outreach in developing countries – Africa's perspective on the IPCC

Rabelani Tshikalanke

The Intergovernmental Panel on Climate Change regularly undertakes outreach events to communicate the findings of its Assessment Reports to broader stakeholders. South Africa was privileged in hosting the African IPCC outreach event that took place on 10th-11th November 2014 and ran in parallel with the South African National Climate Change Conference at the same venue from 10th -14th November, to ensure that the findings of the Fifth Assessment Report were fed into the national policy process. In addition to the main policy dialogue event, media training took place on 9th November and brought together journalists from the African region. The outreach event saw more than 500 delegates attend, including nationals from 25 countries: Egypt, Sudan, South Sudan, Kenya, Uganda, Gambia, Ghana, Mali, Nigeria, Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Namibia, DR Congo and Algeria.

The South African event discussed challenges and opportunities in the region including on how the IPCC produces its assessment reports, how the IPCC reports are consumed by the broad users including media and governments, experience of the African media in climate change reporting, capacity building for local science and research community, and the prospects to improving Africa's contribution to the IPCC process.

The outreach was aimed at raising awareness on the outcomes of the Fifth Assessment Report of the IPCC and the workings of the IPCC, as well as building capacity for media, local science and research community in Africa. Some of the anticipated outcomes were: increasing in IPCC authorship from Africa as well as increasing African media coverage of climate change.

Messages from the media training workshop:

- Understanding the dilemma faced by policy makers when making decisions

  Over the years the IPCC has been criticized for using technical language or scientific jargon in their summary reports for policymakers. Understanding the reality of climate science is less complicated than responding to climate change. Policymakers face the dilemma of making choices from the complicated picture they get from the IPCC assessment reports. The complication is also worsened by the fact that the language of climate science is exact and always needs to be relayed carefully. Part of the problem is that capacity to tailor information to decisions is limited. Policymakers often request quick and certain answers which are simply not readily available. Rather, more needs to be done to inform decision-makers on how to use, and make decisions, based upon the available science and its limitation.

- Experiences of African journalists in reporting climate change

  African journalists have a unique experience in reporting climate change compared to other journalists elsewhere. The challenge for journalists in Africa is how to make climate change interesting to readers. This is because often at times people do not take climate reporting seriously until climate disaster struck. It is for this reason that making linkages to climate change in stories when the links are not immediately obvious is important. African journalists used the outreach event to share their interesting examples of climate change stories that they reported over the years. Some of these reported stories are as follows:

  – Linking climate change to why people are moving into forests in Zimbabwe;
  – In Zambia there is a high degree of absenteeism because girl children have to travel longer distances to go and fetch water;
  – How climate change impacts on Lake Victoria and the effects of the dwindling fish supplies on families;
  – In Uganda human faeces are turned into energy for cooking;
  – Food security in Malawi.

Messages from IPCC outreach

- Prospect to improve Africa's contribution to the IPCC process

  There is a chronic shortage of African scientists contributing to IPCC reports, as well as generally publishing their work in international journals. The most critical step in improving Africa's contribution to the IPCC process should be to improve the participation of developing countries into the IPCC process. There were important lessons learnt by the developing countries in the AR5 process in as far as this critical issue is concerned. In order to improve Africa's contribution to the IPCC, participants made the following recommendations:

  – Setting up communication and outreach activities. Enhance the awareness of the Focal Points regarding IPCC activities and possible funding for scientists from these countries to attend the events. Focal Points and Bureau to nominate more experts/scientists from developing countries (over 3000 were nominated for AR5, but only just over 800 were selected).
  – Ensuring that the selection of authors and reviewers are conceived in a way that facilitates the identification and selection of suitable experts from developing countries.
  – Considering ways to increase funding for participation for the attendance of more experts from developing countries to IPCC meetings.
  – Organising more regional meetings in developing regions.
  – Encouraging the participation of experts from developing countries in the outreach events/process.
  – Encouraging more involvement of young experts from developing countries in the IPCC process.
  – Allowing for the participation of developing countries scientists in the scenario development to get a developing countries perspective.

- Building a community of interface scientists

  There are a number of gaps that hinder the integration of science and decision-making, with communication being among the most prominent gap. While improvements in the ability to model African climate are being made, the ability to communicate this science remains poor: messages are often contradictory and unsuitable for informing adaptation.

  It is therefore of utmost importance to build a community of interface scientists as this will ensure that academic institutions work closely with local community. It is important to note that issues of technology and communication, lack of documents in local languages, and making the reports more accessible remains a barrier to effective science and policy interface. Some suggested solutions to address these barriers were co-exploration between governments and researchers, and embedding researchers within policy institutes (and vice versa).

Advance paper 7

Advance Paper on Communication in the U.S. National Climate Assessment (2014)

Susan Joy Hassol, Director, Climate Communication:

To make the assessment as accessible as possible to its various audiences, decades of experience by many kinds of professionals went into ensuring good communication practices in the third U.S. National Climate Assessment (NCA) released in May 2014.

Attention to communication was integrated from the outset as the best outcomes are achieved when a communication perspective is included in the whole range of decisions: how to organize the report, what questions to ask, what scenarios to use, how to present them, what examples to highlight, and much more.

The first ingredient was, of course, the latest, most comprehensive science. There was also an editorial team whose expertise included how to explain complex science in plain language and how to present and synthesize large bodies of information. Carefully selected professional photographs added another dimension. Team members also included skilled graphic designers who worked closely with the authors and editorial staff to simplify and clarify charts and graphics. Web specialists were additional key players.

In successful efforts, all of these elements come together in an integrated whole in an iterative process. It is not sequential! Too often, scientists write technical chapters and then turn them over to editors to "translate." But it should not be a hand-off. Instead, it should be a conversation – or rather a long series of conversations that create a whole that is far more than the sum of its parts. The process is integrated, iterative, and continuous.

Among the strategies used in the 2014 NCA was developing simple, clear messages, especially in the summary products including the Overview and Highlights. We illustrated those messages with professional quality photographs carefully selected (with review and approval by author teams) using the latest knowledge on how images are perceived. There are people in many of these photographs, which were largely absent from earlier assessments. Including human faces in climate change imagery has been shown to make the issue feel less distant, and more personal and relatable. These images help communicate the major, cross-cutting messages that are reinforced throughout the report: climate change is happening now, it is having widespread impacts, and there are important opportunities to do something about it. We made an effort to include stories (case studies) and photographs of people taking action in response to climate change.

Generally, pairing the threat and the opportunity together is most effective because discussing the problem without mentioning what can be done about it can leave people feeling helpless. This presents a special challenge to the IPCC because of the Working Group structure and the fact that the reports of the three working groups are released separately. Waiting for the release of the synthesis report to make these linkages is not optimal. Responding to this challenge remains a question for those preparing the next round of IPCC reports.

The National Climate Assessment editorial team worked closely and iteratively with the author teams to edit the entire report. We removed jargon, clarified language, and paid attention to words that mean different things to the public than to scientists. I have written and spoken often on this topic of words that mean different things, including in a TEDx talk and in articles that can be found on the website climatecommunication.org

Issues around likelihood and confidence language were discussed at great length among the author team and advisory committee. In the end, the decision was made to use a plain language approach in the Highlights (the 100-page synthesis report). This is in contrast to the two lexicons used in the IPCC reports for likelihood and confidence. In the main report chapters, the NCA applied a system for communicating levels of confidence, but instead of including it in the main text, it was placed in a special section at the end of each chapter called "Supporting Evidence." The Supporting Evidence section of each chapter includes information on the process used by the author team to decide on the Key Messages, the evidence base supporting these Key Messages, new information and remaining uncertainties, and an assessment of confidence in each main finding based on the evidence: very high, high, medium, and low. A table explaining how to interpret each of these four terms is included immediately below the assessment of confidence.

There is an art to summarizing and synthesizing. Chapter by chapter summaries are not always the best approach. Seeking out cross-cutting findings, messages, and themes is a good way to begin. And summarizing can become too general; there is a need for concrete examples. The NCA team developed Key Messages for each of the 30 chapters as well as a set of 12 cross-cutting findings for the report as a whole. The 100-page Highlights document is organized

around the 12 report findings. In it we used icons to provide traceability to the underlying chapters for readers who want more detail.

In the NCA, graphs were never simply dropped in as they appeared in a scientific journal. We strived to make them accessible. We also produced further simplified versions of a limited set that were "broadcast-ready" so the media could use them. This is important because media professionals are busy and often don't have time to recreate graphics, and also because when they attempt to recreate scientific graphics, mistakes can sometimes be introduced. Most people will never see the report – they will see only what comes out in the media, so making such graphics available to the media is important. In the case of the NCA release, President Obama met with broadcast meteorologists from around the country to discuss the report, and our broadcast-ready graphics were used in many of those TV segments. They were also used, and are still used, in a wide variety of other media outlets.

An innovative, inviting, and visually striking website made the report accessible and appealing. The site used the latest design techniques and a narrative approach. It was designed to allow viewers to share pieces of the assessment on social media by providing icons to share a key message, figure, or sub-section directly to Facebook or Twitter. The site also allows viewers to download each graphic and to obtain detailed information including meta-data on each graphic. In addition to the web experts on the staff of the Technical Support Unit, a web design firm was retained to help create the state-of-the-art website.

Media training was an essential element of our success. We held a series of webinars for the full author team during the week before the release, as well as a 2-day, in-person workshop for the spokespeople who were in DC for the release. This included preparation and practice for print, radio, and TV interviews. We also created slide presentations for the authors to use with non-technical audiences and reviewed techniques for communicating with these audiences. Central to all of this training was a focus on the three overarching messages of the report and examples to bring those messages to life. The resulting media coverage showed that the full range of communication practices outlined above worked together to successfully deliver the main messages that emerged from the assessment.

Another aspect of communication concerns engagement and outreach. A network of stakeholder groups (NCAnet) was organized early in the process, providing opportunities for engagement throughout the assessment process, release, and aftermath.

In sum, the third U.S. National Climate Assessment involved no compromise of scientific accuracy while integrating communication best practices that produced an assessment that remains useful to a wide range of audiences.

Advance paper 8

BRIEFING NOTE
FEB 2016

Creating climate science visuals that are accessible *and* scientifically accurate

Recommendations:

1. Just as climate scientists use the best available evidence to make assessments about climate change, the best available evidence of how people process complex information (i.e. from the cognitive and psychological sciences) should be used to inform communication of the science.
2. There should be greater collaboration between the climate science and social science communities to help understand the cognitive challenges experienced by different audiences when interpreting climate science visuals.
3. Developing such partnerships would also enable the application of cognitive insights to improve the accessibility of visuals without compromising their scientific accuracy.

Examples of cognitive insights:

Approaches to achieve accessibility and accuracy

Visuals of the science of climate change can be made more accessible without losing scientific accuracy. Accurate understandings of complex information can be supported by:

- guiding visual attention[1]
- activating relevant frames of knowledge[2]
- structuring information.[3]

Use text appropriately to guide understanding

Different audiences have different information needs and different levels of prior knowledge. These factors can influence which information is attended to in a visual and how that information is interpreted. As a result, simplistic interpretations or misinterpretations of data can occur.

However, text read prior to a visual can direct visual attention, influence how the brain processes visual information[4] and support *appropriate* inference-making.[5] Text supporting a visual should therefore be in close proximity to the visual, suitably salient and easily understood.

Intuitions of 'effective' figures may be wrong

Some experts and non-experts prefer figures that contain more detail and information than needed, even if this makes comprehension more difficult.[6] Intuitive design practices may be the opposite to best practices.

Evaluation of communication materials should use objective measures of cognitive performance, rather than rely on intuitive judgements.

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Advance paper 9

Communication and Outreach on Climate Change

Mercedes Andrade, UNAM, Mexico

Background

The communication of climate change is an important topic at different levels around the world. So, particularly at several forums in Mexico it was agreed to create more dissemination material on this topic (CLIMARED Workshops 2015). This material must be concise, accessible and related to daily activities, so that it can be better understood, in particular for information on physics (https://www.youtube.com/watch?v=BZdz0sRHCDs).

Project

For this reason, at UNAM (National Autonomous University of Mexico), the Research Program on Climate Change (PINCC) has joined forces with the Science Outreach Center (DGDC) to create the project "Communication and Outreach on Climate Change" for the year 2016. The project goal is: "provide a basis to cover the scientific information gaps on the climate change through dissemination and communication products".

The project phases are:

I.a) Diagnose the status of communications areas in UNAM related to the topic, and

I.b) Develop the methodology for climate change communication and dissemination material.

II) Produce and spread the selected material on climate change to academic and general audiences.

Results
(up to 03/02/2016)

I.a) The diagnosis was carried out by an online questionnaire (https://docs.google.com/forms/d/1Og0wmbdB7bn2ItP3FP4bSH1ljbNu5_6oA07PNsOCcF4/viewform) to the University. The results are:

- 18 participating areas (biology, ecology, atmospheric science, geology, Latin America and Caribbean studies, undergraduate studies, humanities, technology and applied science, international cooperation, distance learning, postgraduate studies). (10 women and 7 men, 1 not provided), (1 doctor, 2 masters, 10 graduates and 5 not specified).
- 3 knowledge of IPCC assessment reports, 2 knowledge of national academy reports, 2 knowledge of government reports, 1 knowledge of foreign academy reports, 2 knowledge of journalist reports, 7 none, 1 not specified.
- of the 3 who know IPCC assessment reports: 1 uses the Summaries for Policymakers and Synthesis Reports and 2 use the Physical Science Basis Report.
- issues related to climate change that seemed most important to them are: physics (4), cities (4), biodiversity (3), economics (2), social issues (1), health (1), not specified (2).
- what they would like to know in detail on climate change: concepts (3), evidence (2), the regional impacts (2), risk in general (2), adaptation measures (2) mitigation measures (2), physical science methodologies (2), not specified (1), no answer (3).

Advance paper 10

Exploring Trans-Disciplinary Approaches to Communicating the IPCC Assessment Reports

Jessica Asne Dator-Bercilla with Antonia Yulo-Loyzaga, Gemma Narisma, Rosa T. Perez, Emma Porio,
Christian Aid, Manila Observatory, Ateneo de Manila University

Over the past decade, the Philippines was hit by powerful and devastating hazards. Farmers, fisherfolk, indigenous peoples observed significant changes in climate patterns that challenged their indigenous knowledge on seasonal climates. This resulted in uncertainty and loss of livelihoods and assets for many and, in communities exposed to these hazards, loss of lives. Community partners asked a very simple question, "Why is this happening to us?". This question started our journey that eventually led us to the IPCC Assessment Reports and the journey to trans-disciplinarity.

Apart from the concept of an ecological "karma", Christian Aid and its partners thought there must be a scientific explanation to all these. A Learning Circle involving scientists and local community practitioners paved the way for a more trans-disciplinary way of understanding climate change and risks. We asked climate scientists to explain to us the physical evidence of change and they started characterizing the hazards, explained risks, deepened our understanding of vulnerabilities and what can be done. The IPCC assessment reports were always a reference. In their written form, many can barely understand nor have the patience to read such voluminous documents. Some of us saw practical use in the Summary for Policymakers. Still, for a non-physical scientist, the documents were not very easy to comprehend.

A strategy that worked for us is facilitating the coming together of scientists, development practitioners, policy advocates, local communities and local governments to discuss the content of the Assessment Reports. This practice has evolved since 2007 and allowed us to deepen the understanding on the science of climate change as we went through AR4, SREX and AR5 with scientists who were also involved in the assessments.

For the AR5, CORDEX-SEA explained AR5 to CSOs in various fora in Asia. Some scientists involved in the preparation of the report shared the application of the findings in very specific development contexts (i.e. coastal, urban, agriculture) so that other stakeholders can identify with the report. CORDEX-SEA also made sure they invite practitioners to their scientific meetings where the complexity of the climate science is discussed. Manila Observatory, on the other hand, took the communication of the AR5 reports to another level by finding ways to enable scientists to share their knowledge in a language that can be better understood by various stakeholders --- ie development practitioners, military, business, local urban and rural communities, the Church, youth, national and local governments, international humanitarian organizations among others. The climate scientists patiently explain the climate system, the interaction of elements, characterized the potential hazards, the challenge of emissions, what radiative forcing means and how these elements interact with vulnerabilities to create risks. Beyond these, they are willing to discuss with development practitioners and partners how these risks can be addressed through mitigation, adaptation, risk reduction, resilience. They were also willing to expose their science to legislative scrutiny and the dynamics of governance, so that the recommendations in the AR5 can be translated into policy and practical applications. A key example is using key AR5 findings in an action-oriented research on Coastal Cities at Risk that exposed policymakers and implementers to the relevance of science in governance and informed policy formulation.

In brief, the most powerful media for communicating the AR5 for us did not come through written, digital or animated form. The media of communication were the scientists and other stakeholders who were willing to search for a common language, and subject themselves to a dynamic process of dialogue and learning where no one has the sole monopoly of knowledge. They made other stakeholders feel that they were part of an inclusive knowledge-building process rather than mere recipients of knowledge. The modality had to be trans-disciplinary if the science were to become relevant to non-scientists and find space in development aspirations. In the process of doing so, the exchanges did not just transfer information; rather, they created a social capital that was and can be used for policy reform, empowerment and development. These, too, will be the recommendations I will make for the effective communication of subsequent AR reports.

Advance paper 11

Improving communication of uncertainty in the IPCC reports

David V. Budescu[1]

Background

Results of scientific studies and projections of models in various domains are inherently uncertain. Accurate communication of these uncertainties to the general public and to policy makers is critical. The language of uncertainty may itself be a source of confusion. Uncertainties can be communicated as precise values (e.g., *there is a 0.5 chance*), as ranges (e.g., the *probability is between 0.3 and 0.6*, or *the probability is at least 0.75*), as phrases (e.g., *it is not very likely*), or by combining some of these modalities.

People, overwhelmingly, prefer to communicate uncertainty by using verbal terms because they are perceived to be more natural and intuitive. Most people tend to avoid the use of precise numerical values because they can imply a false sense of precision. Research also shows that people's interpretations of probability phrases vary greatly (see Wallsten & Budescu, 1995). The naïve under-appreciation of the natural variability in people's intuitive understanding of phrases used to convey uncertainty can create "an illusion of communication" and undermine the quality of subsequent decisions.

Given this problem many organizations have developed "standardized lexicons of uncertainty". Indeed, this is the approach that was taken by the IPCC (see Mastrandrea et al., 2010), which has adopted a conversion table that links a finite set of phrases with specific (overlapping) ranges of probabilities (e.g., *unlikely < 33%; very likely> 90%).* All contributors to the reports are instructed to refer to this table when making probabilistic pronouncements. The table is also included in all IPCC reports to help readers make sense of the assessment.

Probability words and / or numbers?

It is natural to ask whether the readers of the assessment reports interpret it probabilistic pronouncements as intended by the authors. My colleagues and I have conducted a large scale multi-national study to test the public's understanding of these expressions. We administered the survey in 25 samples and 17 languages and obtained almost 11,000 valid responses. Participants saw 8 sentences from IPCC reports (including the terms *very unlikely, unlikely, likely* and *very likely*) and provided their numerical estimates of the probability, as well and lower and upper bounds of the sentences' intended meaning. *In all the samples the public interprets the probabilistic statements in the IPCC reports as less extreme – much closer to 50% - than intended by the authors!*

Participants were randomly assigned to one of two experimental groups. One group saw the IPCC statements, as they appear in the report along with its translation table. The *Verbal – Numerical* group always saw the verbal terms and their numerical ranges simultaneously. For example, when the sentence "It is very likely that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent" was shown to respondents in this N group, uncertainty was described as very likely (greater than 90%).

Budescu, Por, Broomell and Smithson (2014) found that *the new communication format was highly beneficial: (a) the level of correspondence between the public's interpretation of the terms and the IPCC guidelines increased significantly (See Figure 1); (b) the terms were better differentiated by the readers; and (c) the range of values associate with the various terms was reduced. These qualitative patterns were remarkably stable across all samples and languages. Remarkably, (d) the joint presentation format makes the meaning of the terms more similar across languages facilitating international communication. Remarkably, (d) the joint presentation format makes the meaning of the terms more similar across languages facilitating international communication.*

Optimal definitions of the probability words' meaning

Another problem with the current conversion table is related to choice of the cut-off points that differentiate between the terms. These values do no match most people natural and intuitive usage of the

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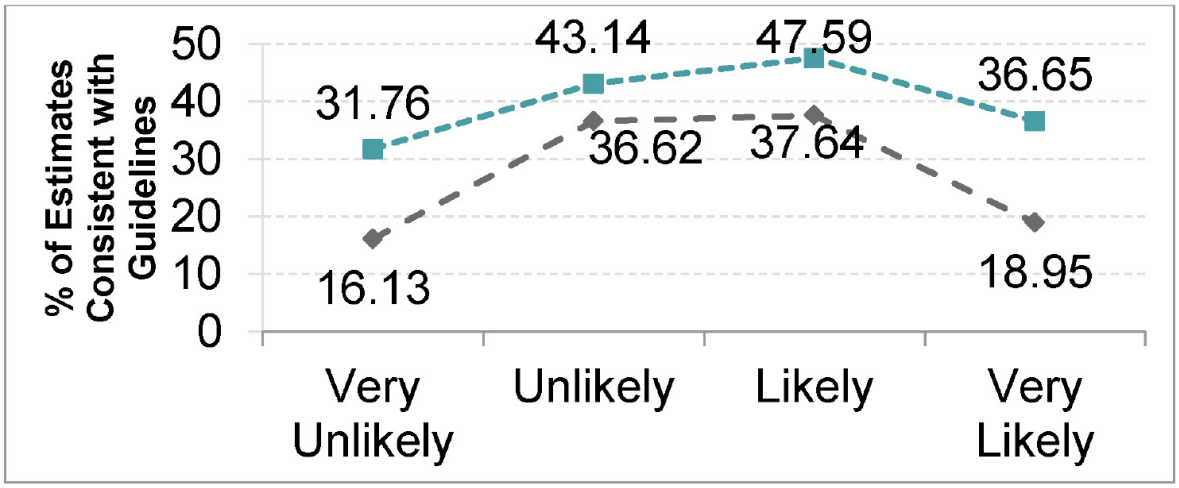
terms. Ho, Budescu, Dhami and Mandel (In press) have illustrated the superiority of evidence-based communication lexicons using data from the same survey. The participants were asked to indicate the numerical meanings they assign to the same four phrases in their daily use, without specifying any particular context. We used standard statistical techniques to analyze the estimates of the US sample and derived cutoff points to maximize the agreement in meaning across all respondents. It is crystal clear that the IPCC's ranges for *very unlikely* and *very likely* are much too narrow and too extreme (closer to the end points, 0 and 1) by comparison with the respondents' intuitive and natural interpretations of these phrases.

In order to compare how effectively the evidence-based lexicon and the IPCC guidelines convey information about uncertainty, we re-analyzed evaluations of the phrases in the eight IPCC sentences, using the responses of the Australian and U.K. samples. The mean consistency rates in these samples were around 40%, and clearly outperformed the current IPCC lexicon, which has a consistency rate of 26%. *The effectiveness of communication of uncertainty can be easily improved by revising the definitions of the terms, in line with people's natural understanding of these phrases.*



Recommendations

These results provide strong justification for revising the way the IPCC communicates uncertainty to the public and policy makers. I recommend continuing the use of the 7 verbal categories used in AR5 (Mastrandrea et al., 2010), but:

1. Change the thresholds defining the bounds of the categories to
    a. Reflect the general public's intuitive and natural interpretation of the 7 words, and
    b. Generate a partition (mutually exclusive and exhaustive categories) of the probability scale, excluding overlapping categories.
2. Whenever one of the probabilistic terms is used, it should always be accompanied by a range of numerical values.
3. The default range for each term should be the one listed in the translation table (see point 1 above), but if the authors are sufficiently confident about a certain event, they should be allowed to narrow the range, as long as it is consistent with the table. For example, if by default Likely is mapped into the 60% - 85% range, authors should have the option to use a narrower range (for example, Likely (65% -75%), if the data warrant such determination.

These changes would improve the effectiveness of the communication by appealing to readers who prefer different communication modes, would facilitate communication across cultural and linguistic bounds and would allow IPCC authors more flexibility.

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Advance paper 12

IPCC Communications – Loose thoughts from a heavy user

Claudio Angelo*

The IPCC *thinks* of itself only as a scientific panel, but it is actually a communications organization as well. Part of its core business is to communicate climate science to non-specialists (policymakers). So communications should be at the heart of every IPCC meeting.

But don't take my word for it. See, for instance, Barkemeyer *et al.*:

> Engaging professional science communicators as part of the negotiation of SPM texts could improve the readability of these documents, in particular given that we found that this negotiation between countries and scientists at the IPCC AR5 WGIII plenary had a further detrimental impact on the readability of their SPM.

However, topic 17 of the Panel's comms strategy has it all backwards:

"**approved** IPCC reports and other products form the basis for communications materials"

Telling scientists to mind their language and letting comms people in only afterwards, as a mitigation measure, won't cut it. Steps need to be taken to integrate communications to the process as it evolves, as fully as possible and without compromising the known IPCC constraints. For that to happen, the problem must be broken down in at least three parts, according to three major audiences of the IPCC, as hinted at in the comms strategy:

- Policymakers (prime target);
- The general public;
- The media

Policymakers (The SPM)

Just by looking at the AR5 WGI SPM (the most readable of the three, according to Barkemeyer), one can notice several things that could be improved:

- "*So what*"?: Conclusions about several aspects of the climate system that seem obvious to the specialist might not be so to the politician. Right, the ocean stores 90 percent of all energy. And…? How does it affect my constituency? What does it mean?
- *Avoid different metrics* (or explain them): GT C x GT CO_2, end dates for projections (2081-2100 changes compared to 1986-2005, then 2100 compared to pre-industrial for the same projections – very confusing!). Why are so many different periods used as references? Is it a lack of communication among the different WGs and lead authors?
- *Help politicians gauge risk.* Mortals don't get statistics, so it's hard for a politician to judge based on confidence intervals and sigma levels. Even though the IPCC can't be policy-prescriptive, it can explain the odds of a given finding or the likelihood of a scenario in a way that politicians understand – for instance, a colour code for confidence intervals or risk (eg. AMOC collapse in the 21st century is a potentially catastrophic – red light on risk –, but unlikely event – green light on probability).

The General Public (Website)

The IPCC website is functional and relatively easy to navigate. However, it is still too shy and sober. As the public face of IPCC, the prime interface between the panel and society, it should invite people to understand climate change.

- Can the website be made sexier? A prime instance of "sexification" was carried out by the UNFCCC (subject to similar constraints), with a "public interface" portal in addition to the traditional website.

* Claudio Angelo is the communications coordinator of the Brazilian Climate Observatory, a network of 38 civil society organizations. His book *A Espiral da Morte (Death Spiral)* draws heavily upon AR4 and AR5.

- Can the IPCC create a hub for climate information derived from the IPCC reports and presented in a "Nasa Climate" kind of way? Hire science writers and multimedia people to convert content to videos, short texts, infographics (not just graphics!)?
- Packages of "active" communication (e.g. what do the models say for South America, East Africa, or Oceania? Can those be bundled into regional communication kits and made available for download, in accessible language – "for dummies"?). That could be a way to test integration between WGs I and II.

The Media

Specialized media don't seem to have much trouble reading IPCC materials, but would profit from measures taken towards readability for policymakers. The challenge seems to be how to maintain interest of the media in times of "normal science", when for practical purposes the big picture on the science is sorted.

On the other hand, the UNFCCC's assignment to the IPCC on 1.5 degrees scenarios, for instance, is bound to raise fresh media interest – and call into question the panel's relationship with governments.

- An emerging theme, that may demand reactive communication, is the "scientific integrity" of mitigation policy assessments (is 1.5 degrees ruled out in realistic scenarios? Can we really install all that BioCCS? What are the limitations that the climate modeling community faces and what are the difficulties to generate more regionalized information at a more refined scale? Can the role of the IPCC be clearer with regard to the scenarios construction and modeling exercises?)
- On active communication: does it fall outside IPCC's constraints to produce "downloadable" and "shareable" content for on-line media?

Advance paper 13

nature climate change

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Linguistic analysis of IPCC summaries for policymakers and associated coverage

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The Intergovernmental Panel on Climate Change (IPCC) Summary for Policymakers (SPM) is the most widely read section of IPCC reports and the main springboard for the communication of its assessment reports. Previous studies have shown that communicating IPCC findings to a variety of scientific and non-scientific audiences presents significant challenges to both the IPCC and the mass media. Here, we employ widely established sentiment analysis tools and readability metrics to explore the extent to which information published by the IPCC differs from the presentation of respective findings in the popular and scientific media between 1990 and 2014. IPCC SPMs clearly stand out in terms of low readability, which has remained relatively constant despite the IPCC's efforts to consolidate and readjust its communications policy. In contrast, scientific and quality newspaper coverage has become increasingly readable and emotive. Our findings reveal easy gains that could be achieved in making SPMs more accessible for non-scientific audiences.

Given the magnitude of the problem, as well as the diverse set of audiences the IPCC reports to, the way in which findings have been communicated to—and received by—the media has sparked considerable controversy[1,2], epitomizing the sharp divide between communicating within the scientific community and conveying findings to the media[3]. Crucially, IPCC SPMs can be seen as reporting from experts in one field (scientists) to experts in different fields (scientists from other fields and policymakers), with all the disciplines and sub-disciplines each of these fields contain. The IPCC's efforts to consolidate and readjust its communications policy illustrate the challenges this creates. The IPCC's remit is to synthesize and communicate the current state of climate research to governments and policymakers at all levels[4]. Its findings should be communicated in a way that can be understood by a non-scientific audience[5]. One of its key principles is to be policy-relevant, but not policy-prescriptive[6]. We would therefore expect SPMs to reflect these principles by adopting a clear and neutral language that can be understood by a non-specialist audience. At the same time, it is of crucial importance how the print media interpret the results presented by the IPCC, as pivotal agents in science communication[7] to the general public. Previous research has focused on the way in which IPCC probabilistic statements are interpreted[8,9], and on the discursive construction of the IPCC in national newspapers[10] and social media coverage[11,12], including the influence of grammatical and word choices[13].

The purpose of this study is to analyse the language that has been used in IPCC SPMs as well as a sample of popular science journals and UK and US national (quality and tabloid) newspapers on the launch of the IPCC assessment reports ($N = 1{,}010$; see Supplementary Table 1) between 1990 and 2014. We focus on two dimensions of this communication process. The Flesch Reading Ease (FRE) algorithm[14,15] enables us to assess the comprehension of IPCC SPMs and related print media coverage. The algorithm is based on the assumption that text containing longer sentences and more complex words is more difficult to comprehend. The content analysis software DICTION[16] allows us to assess the degree of optimism—and therefore the tone—of different bodies of text. Both are widely established metrics that have been used in a variety of contexts ranging from paediatrics[17] to accounting research[18,19].

FRE scores by publication type for the period 1990–2014 are presented in Fig. 1. Average scores reflect that all four publication types target different audiences, employ a different language and transmit different messages. Mean scores across tabloid newspapers (*Daily News, The Mirror, The Sun*) and quality newspapers (*New York Times, Washington Post, The Independent, The Times*) are relatively low compared to the way in which these publications cover other issues[14]. This is unsurprising given that the launch of an IPCC report is a very specific event referring to a complex phenomenon. For scientific publications, only editorials and news articles of *Nature* and *Science* were considered. They occupy a middle-ground between IPCC SPMs and quality newspaper coverage. IPCC SPMs and tabloid coverage on the launch of the reports clearly stand out, with mean FRE scores of 20 and 50, respectively (Fig. 1).

However, changes can be observed over time in some publication types (Fig. 2; see also Supplementary Fig. 1). Readability of quality newspapers and scientific publications peaks in 2007, possibly as a result of a relatively high share of opinion pieces linked to increased public concern triggered by major media events around the time, such as the Stern Review[20] and the Nobel Peace Prize awarded to Al Gore and the IPCC[21]. The Fourth Assessment Report in 2007 is also the first IPCC Report to receive considerable coverage by tabloid newspapers included in our sample.

In contrast, readability of IPCC SPMs does not follow this trend. Although no significant differences in readability scores can be identified in mean scores between the five different assessment periods, descriptive statistics show that mean readability scores

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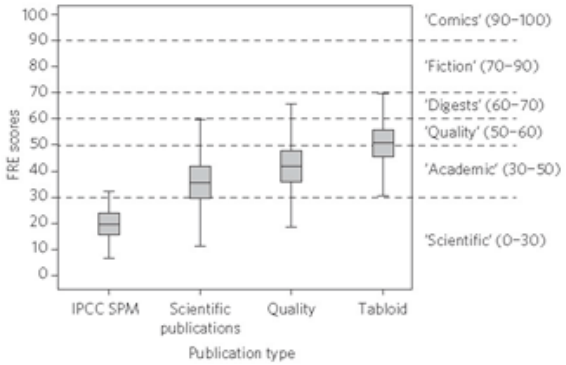

Figure 1 | Box-and-whisker plots showing FRE scores for IPCC SPMs and scientific publications (*Nature* and *Science*) as well as quality (*The Independent*, *The Times*, *New York Times*, *Washington Post*) and tabloid newspapers (*The Mirror*, *The Sun*, *Daily News*) related to the launch of IPCC assessment reports from 1990 to 2014. On the right-hand side are typical FRE ranges for different types of publications.

for the First Assessment Report (AR1) SPMs are notably higher than for those of later assessment periods. This decrease might reflect the increasing complexity of the underlying science over time. At the same time, later SPMs might assume a higher degree of prior knowledge on behalf of the reader. For example, the initial sections of the AR1 Working Group 1 SPM (*'Introduction: what is the issue?'*, FRE 44.1; *'What are the greenhouse gases and why are they increasing?'*, FRE 37.4) provide a more general introduction to the subject area and are clearly aimed at a non-expert audience. As such, readability scores of these sections are notably higher than the remainder of this SPM. No such passages, introducing the basic underlying science in layman's terms, can be found in later SPMs. However, this decrease in readability over time is not a uniform trend across the different Working Groups (WGs). WG2 and WG3 show clear downward trends, whereas readability of WG1 SPMs remains relatively stable over time. In line with previous studies[22], these differences between Working Groups show that natural sciences are not necessarily the most difficult ones to communicate to general audiences.

In addition to the link between scientific fields and writing styles, another more pragmatic reason could be that WG2 and WG3 are much more diverse in terms of the scientific fields they draw from than the relatively homogeneous WG1[23]. Likewise, findings from WG2 and WG3 might be exposed more directly to pressures arising from the remit to be policy-relevant but policy-neutral[6]. This diversity of scientific fields and policy implications might result in a greater need to compromise, in turn resulting in longer and more complex sentences. The AR5 WG3 SPM is the least readable document across the entire sample, with a FRE score of 6.7.

A different pattern can be identified in the readability of synthesis reports (SYR) over time. Again, the AR1 synthesis report shows the highest readability score. However, readability drops sharply in AR2,

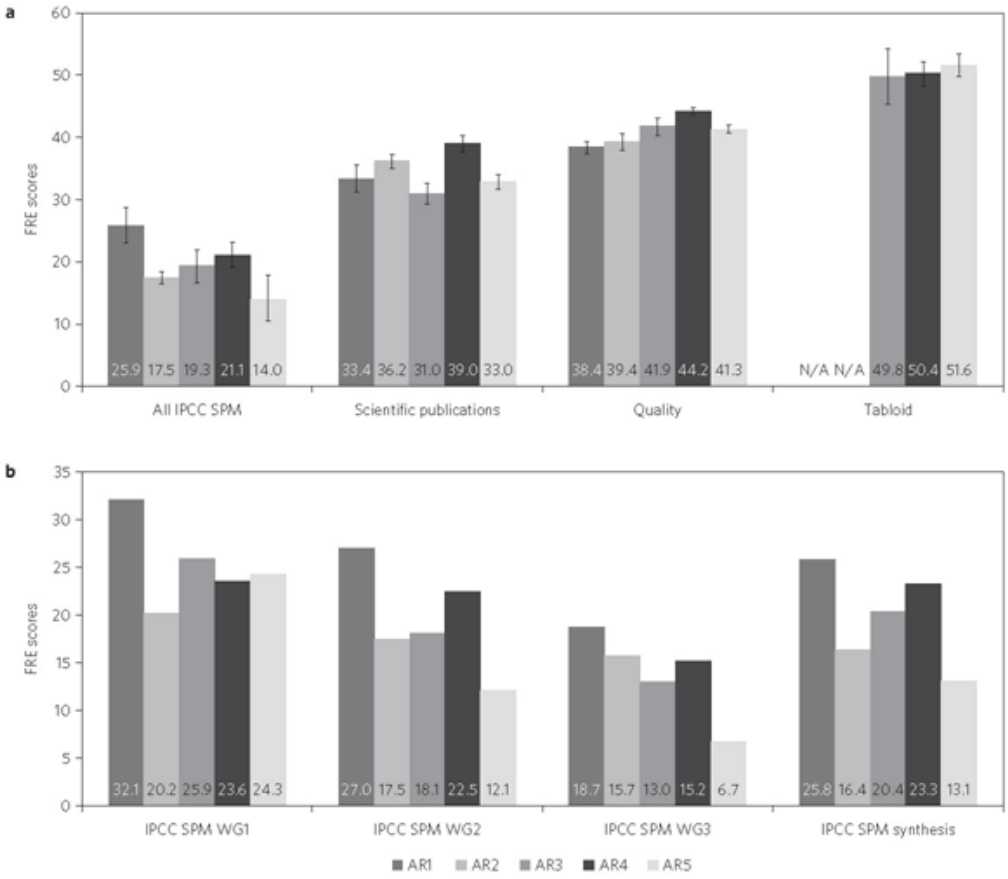

Figure 2 | Mean FRE scores over time for IPCC SPMs and scientific publications, as well as quality and tabloid newspapers related to the launch of IPCC assessment reports from 1990 to 2014. a, Overall mean FRE scores for the four publication types (with standard errors). **b**, FRE scores for the individual IPCC SPMs for each WG and synthesis report (or equivalent).

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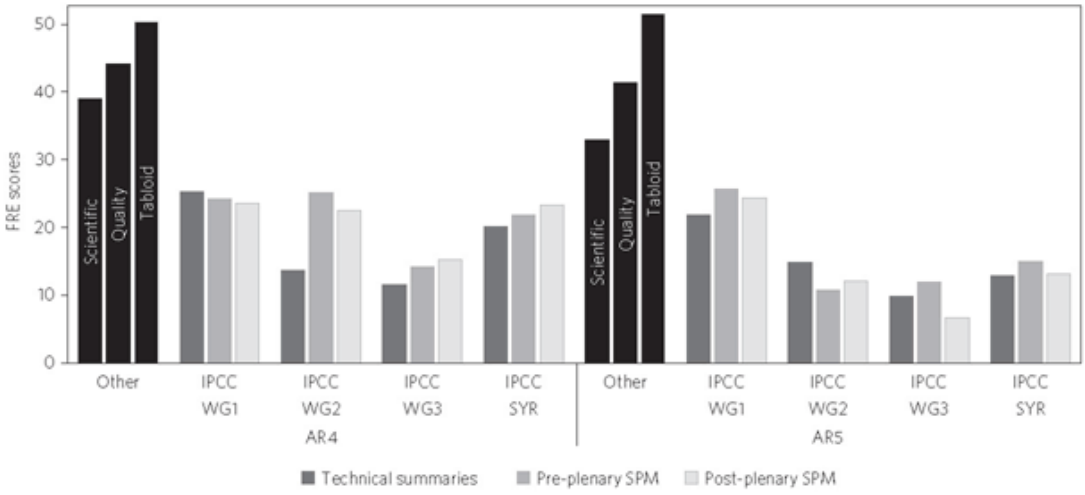

Figure 3 | Comparison of FRE scores for pre- and post-plenary AR4 and AR5 IPCC SPMs as well as TSs. We found no significant differences in mean scores between pre- and post-plenary versions as well as TSs. For illustration, mean scores for AR4 and AR5 are also included for the other three publication types (black bars).

subsequently recovering in AR3 and, in particular, AR4—albeit remaining at a level that is lower than in AR1. There is another sharp drop in readability from AR4 to AR5, which is not surprising given the low readability scores of AR5 WG3 and WG2. The average readability score across the three Working Groups for each assessment report is very close to the readability score of the synthesis SPM for each assessment report. This observation is consistent with the fact that the synthesis report draws most of its text from the other Working Group's SPMs.

The readability of Technical Summaries (TSs), pre-plenary and post-plenary SPMs for each WG in AR4 and AR5 were compared (Fig. 3). TSs are intended to capture the most important scientific aspects of the full Working Group assessment report; they are longer than SPMs and include pointers to the chapters and sections where the full assessment can be found[24]. The pre-plenary SPM is a confidential draft that is sent to governments for a final review a few months before the WG and IPCC session that approves and accepts the SPM (thus making it post-plenary after copyediting) and the assessment report respectively. The plenary process is important to the SPM because its 'approval' means that the material has been subjected to detailed line by line discussion and agreement between government delegates and authors. Being more scientific, one would expect TSs to be less readable than SPMs and, given the line by line approval, one would expect pre-plenary SPMs to be less readable than post-plenary SPMs. This logical pattern is observed only twice (AR4 WG3 and SYR), and its reverse once (AR5 WG2), with one more occasion when the readability of the TS is higher than that of the SPMs (AR4 WG1). In all other instances (five out of eight cases), TS readability is lower than SPMs readability, expect for AR5 WG3 post-plenary SPM (which is exceptionally low). When comparing pre- and post-plenary SPMs, in five out of eight cases, the readability is lowered by the plenary process. We compared each change in AR4 and AR5 SPM readability (from pre- to post-plenary) with IPCC plenary discussions as reported by the Earth Negotiation Bulletin[25] (see Supplementary Table 2). We found a strong relationship between political mood and SPM readability. When political tensions and disagreements are high (AR4 WG1, WG2 and AR5 WG1, WG3, SYR) readability is lowered. When plenary sessions are characterized by efficient organization, constructive and straightforward exchange, and a good spirit of cooperation (AR4 WG3, SYR and AR5 WG2), readability is increased. It is worth highlighting AR5 WG3 as the largest decrease

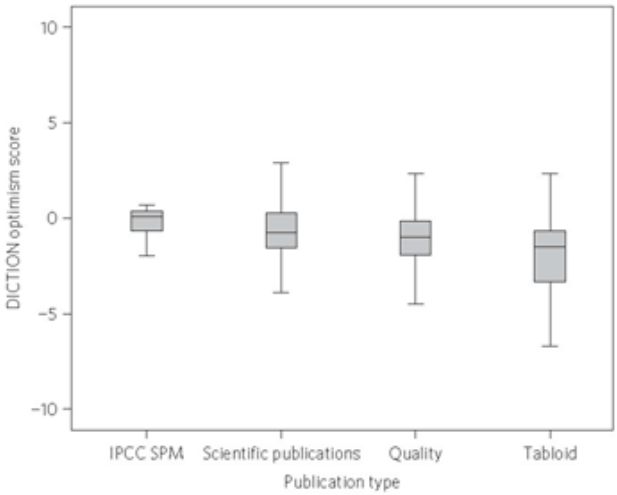

Figure 4 | Box-and-whisker plots displaying DICTION optimism scores for IPCC SPMs, scientific publications, quality and tabloid newspapers related to the launch of IPCC assessment reports from 1990 to 2014.

in readability after plenary in our sample ($\Delta FRE = -5.3$); Earth Negotiation Bulletin reporting of this plenary session shows the political nature of discussions characterizing line by line approval as 'arduous' and 'concerns of countries often expressed in the UNFCCC [United Nations Framework Convention on Climate Change] context leaking into the IPCC plenary'.

Clear differences can also be identified between the different publication types as well as over time in terms of DICTION optimism scores (Fig. 4). Starting with the assumption that IPCC SPMs adopt a language that is neutral in tone, we have used the mean optimism score across all IPCC SPMs as a benchmark for our assessment. For all other documents, raw DICTION scores were converted into Z-scores, expressing the deviation of the score of each individual document from the mean score of IPCC SPMs, divided by the standard deviation. We can therefore identify how the tone of related media coverage differs from the original SPMs. Supplementary Table 3 provides illustrative examples of coverage with corresponding readability and optimism scores.

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Table 1 | Most popular terms underlying DICTION positive/negative dictionary by publication type.

IPCC SPM		Scientific publications		Quality newspapers		Tabloid newspapers	
Term	Δ Frequency	Term	Δ Frequency	Term	Δ Frequency	Term	Δ Frequency
Risk	**+5.19%**	**Problem**	**+1.29%**	*Power*	*+0.84%*	**Flood**	**+3.15%**
Growth	*+1.84%*	**Needed**	**+0.96%**	**Worse**	**+0.77%**	**Poverty**	**+1.57%**
Important	*+1.56%*	*Support*	*+0.87%*	**Problem**	**+0.52%**	**Threat**	**+1.46%**
Vulnerable	**+1.53%**	*Important*	*+0.69%*	*Clear*	*+0.52%*	**Blame**	**+1.42%**
Negative	**+1.52%**	*Good*	*+0.65%*	*Good*	*+0.41%*	**Worse**	**+1.31%**
Enhance	*+1.46%*	*Reason*	*+0.52%*	*Kind*	*+0.37%*	**Stop**	**+1.10%**
Adverse	**+1.46%**	*Knowledge*	*+0.52%*	**Tornado**	**+0.35%**	**Suffer**	**+1.04%**
Lose	**+1.40%**	*Strong*	*+0.49%*	*Prime*	*+0.33%*	*Truth*	*+0.97%*
Health	*+1.30%*	*Success*	*+0.49%*	*Hope*	*+0.32%*	*Prettier*	*+0.94%*
Productive	*+1.26%*	**Hard**	**+0.42%**	*Reason*	*+0.31%*	**Crises**	**+0.84%**
Stress	**+1.16%**	**Erroneous**	**+0.39%**	**Fail**	**+0.28%**	**Disaster**	**+0.78%**
Qualified	*+0.93%*	**Gross**	**+0.37%**	*Love*	*+0.27%*	**Danger**	**+0.76%**
Positive	*+0.81%*	*Sense*	*+0.37%*	**Poverty**	**+0.23%**	**Storm**	**+0.74%**
Knowledge	*+0.63%*	*Careful*	*+0.36%*	**Revolution**	**+0.23%**	**Death**	**+0.72%**
Secure	*+0.61%*	*Clear*	*+0.35%*	**Sacrifice**	**+0.23%**	*Authoritative*	*+0.54%*

'Δ Frequency' denotes the relative frequency of a term for a specific publication type compared to the overall sample on average. For example, across the sample of tabloid coverage, 'flood' accounts for 6.65% of all mentions of terms indicating either a positive or negative outlook in the DICTION dictionary. By comparison, the relative frequency across all four publication types is 3.15% lower. DICTION terms indicating a positive (negative) outlook are shown in italics (bold).

On average, the tone of scientific publications, quality and—in particular—tabloid coverage is clearly more pessimistic than the tone found in the IPCC SPMs. In line with previous research[26], the clearest deviations can be found among tabloid newspapers. Newspapers need to turn a piece of scientific information into a piece of news, which among other aspects requires bringing future climate change consequences into the sphere of immediate interest of the reader. Using emotive language is one of the journalistic strategies for bringing the future into the immediate[27].

Linguistic differences in coverage between publication types are also reflected by the frequency of terms indicating a positive or negative outlook in the DICTION dictionary. Table 1 presents a comparison of terms according to their relative frequency in each of the four publication types. Unsurprisingly, 'risk' emerges as a central term in SPM texts: across all 20 SPMs, the term is mentioned 462 times, and thus accounts for 10% of all cases in which any of the 784 DICTION terms indicating either positive or negative outlook are mentioned. In stark contrast, the mean frequency of the term 'risk' across all four publication types is half of that. The terms with the highest differential in frequencies for SPMs compared to other publication types indicate a very measured use of language; for example, 'positive', 'negative', 'important', 'qualified' or 'knowledge' all reflect a comparatively neutral tone, even though they indicate a positive or negative outlook.

Tabloid coverage reflects a clearly different use of language. Extreme weather events ('flood', 'disaster', 'storm') and their catastrophic consequences ('poverty', 'crises', 'death') emerge as common themes. Overall, negative terms predominate, in contrast to the three other publication types, which reflect a more balanced distribution of positive and negative terms.

Beyond the differences in mean optimism scores, interesting changes over time can be identified (Fig. 5; see also Supplementary Fig. 2). Scientific publications show relatively moderate deviations from SPM optimism scores, with only little visible differences over time. In stark contrast, a downward trajectory can be identified in quality and tabloid newspapers, with the tone of coverage becoming increasingly pessimistic over time. It should be noted that the extreme score for tabloid coverage around AR3 is based on only five tabloid articles published in this period. Again, increasing levels of public awareness of climate change might have resulted in a profound change in newspaper coverage of the launch of IPCC assessment reports: related coverage can be expected to have moved from the science section towards headline news over time, in turn resulting in a less neutral—and thus more emotive—tone of this coverage. This is further supported by the fact that, over time, more extreme values—and thus an increasing polarization—can be identified in both quality and tabloid newspaper coverage. In 1990, deviations of more than one unit from mean IPCC SPM optimism scores could be found in 50% of all coverage in that year. However, this share steadily increases to 68% in 2013/14. It is interesting to note that, across the sample, FRE scores are significantly negatively correlated with DICTION optimism scores (Spearman's ρ; $r = -0.17$; $p < 0.001$). In other words, more readable text tends to have a more pessimistic tone.

Our findings have important implications for the IPCC and communication of science more generally. The IPCC needs to find ways to improve the readability of its SPMs, particularly those of WG3, but also WG2 more recently. Engaging professional science communicators as part of the negotiation of SPM texts could improve the readability of these documents, in particular given that we found that this negotiation between countries and scientists at the IPCC AR5 WG3 plenary had a further detrimental impact on the readability of their SPM. At the same time, plenaries are time-constrained events where yet another actor could potentially hinder rather than help, and add to already existing concerns that the original voice of the scientific panel could be distorted and politicized[28]. An alternative could be science communication training for parts of the panel, for example, lead authors involved in producing the pre-plenary SPM.

To a certain extent, the way in which the IPCC has addressed the treatment of uncertainties could serve as a blueprint for this process. Here, a series of guidelines were put together to assist lead authors with this topic in more recent reports[29,30], which helped to use more comprehensible and less ambiguous language. This practice could be extended to science communication more generally.

The need for more effective communication to non-scientific audiences has long been identified as a crucial challenge for the IPCC[31]. However, it has becomes particularly urgent given

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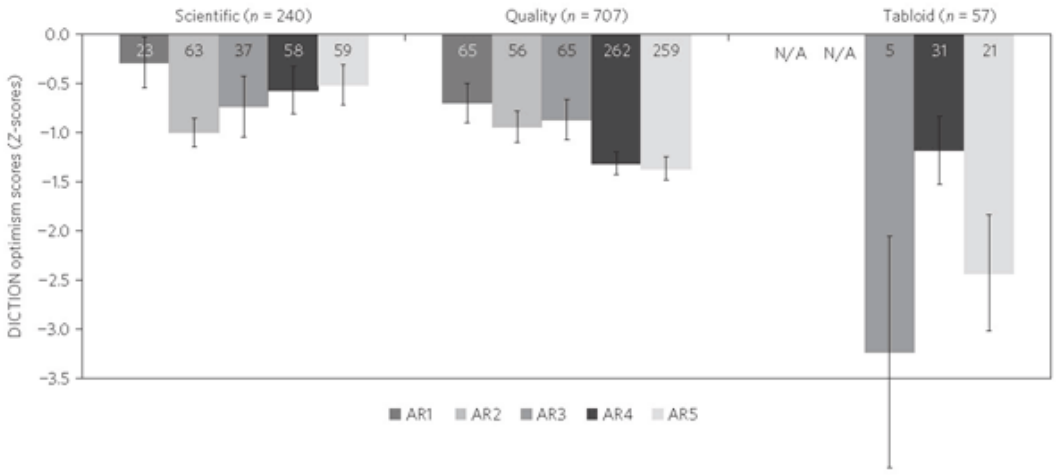

Figure 5 | Mean DICTION optimism *Z*-scores (with standard errors) of different types of media compared to the IPCC SPMs mean over time. Numbers on bars indicate the size of individual subsamples. Before 2001, no coverage on the IPCC could be found in any of the three tabloid newspapers included in the sample (*The Mirror*, *The Sun*, *Daily News*).

the observed trends in newspaper coverage on the topic. Our findings are in line with existing studies observing a distortion of scientific knowledge in the popular media based on various journalistic norms[32,33], in turn shaping the social construction of climate change[34]. Our findings also provide further evidence that the mainstreaming of climate change is likely to exacerbate this mismatch between scientific and wider societal understandings of climate-related knowledge: the more climate change-related news has moved beyond the science niche towards headline news in recent years, the more likely we have been to see increasingly emotive, opinionated coverage in the popular media. Thus, there is an even greater need for the IPCC to communicate its findings in a way that non-scientific audiences (including the news media as transmitters) can comprehend their findings. Despite the various obstacles to effective science communication[35,36], the readability scores of scientific publications in our sample indicate that clear improvements are possible in this regard.

Methods

Methods and any associated references are available in the online version of the paper.

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Author contributions

R.B. and B.M.-S. conceived the study. R.B., S.D. and G.N. designed the study. All co-authors contributed to analysis and writing.

Additional information

Supplementary information is available in the online version of the paper. Reprints and permissions information is available online at www.nature.com/reprints. Correspondence and requests for materials should be addressed to R.B.

Competing financial interests

The authors declare no competing financial interests.

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Methods

We conducted a linguistic analysis of IPCC SPMs and related print media coverage for each of the five assessment reports. The analysis focused on SPMs as well as leading scientific journals (*Nature*, *Science*) and UK- and US-based quality (*The Independent*, *The Times*, *New York Times*, *Washington Post*) and tabloid newspapers (*The Mirror*, *The Sun*, *Daily News*). Newspapers were selected based on type, circulation and political alignment. In an initial step, other UK-based quality newspapers such as *The Guardian* and *The Daily Telegraph* were also included in the sample for a preliminary analysis. Based on the fact that there was hardly any coverage on the IPCC linked to the first three assessment reports in *The Daily Telegraph* (no coverage at all for AR1 and AR2), we decided to select *The Times* as the quality newspaper with the highest circulation among UK centre-right publications. Resulting from this choice, we then decided to select *The Independent*—which we consider as a centre-left leaning quality newspaper—to arrive at a balanced sample. *The Independent* and *The Times* have repeatedly been used in analyses of UK-based quality newspapers in the context of climate change[34,37,38]. There would not have been a US-based quality newspaper equivalent of *The Guardian* available, and *The Independent* is the centre-left leaning quality newspaper with the second-highest circulation in the UK (after *The Guardian*). However, the inclusion of *The Guardian* would not have produced significantly different findings. Our preliminary analysis showed that although IPCC-related coverage was significantly higher in *The Guardian* when compared to the four newspapers included in the sample, overall mean readability scores for the set of Guardian articles was 40.1 and therefore very much in line with our sample of quality newspapers; likewise, DICTION optimism scores reflect the pattern identified for our sample.

For each of the assessment reports, media coverage was collected starting two months before the launch of the first Working Group report and ending two months subsequent to the launch of the synthesis report. Full-text articles were obtained from various databases, such as *LexisNexis* and *Factiva*, and stored as simple text files for cleaning and subsequent processing. The search terms 'Intergovernmental Panel on Climate Change' and 'IPCC' were used to identify relevant articles. These were subsequently screened to exclude unrelated news articles. In particular, this included UK-based coverage on the Independent Police Complaint Commission, which is also abbreviated as IPCC. For *Nature* and *Science* coverage, research articles and review articles were excluded from the sample, given the time-lag between submission and publication, as well as clear differences in writing style. All relevant articles published between two months before the launch of the first assessment report and two months after the launch of the last assessment report were included in the sample ($N = 1{,}024$; Supplementary Table 1). In a separate analysis, the readability of AR4 and AR5 SPMs was compared with their pre-plenary versions as well as AR4 and AR5 Technical Summaries.

Cleaning consisted of the removal of special characters not recognized by the tools employed, as well as spurious space characters introduced in the middle of words by the copy-and-paste operation. The former was achieved automatically by a routine run over all documents, the latter by automatically tabulating orthographic mistakes for each document and manually opening and fixing those showing broken words errors. Finally, a third routine automatically replaced British English with American English spelling, as the latter is used by the DICTION software package.

FRE[34] scores were calculated using a Visual Basic routine processing all files in Microsoft Word 2010. MS Word 2010 implements the original FRE algorithm, which is based on the assumption that text containing longer sentences and more complex words is more difficult to comprehend. It provides a score between 0 and 100, with easy-to-read texts scoring higher than more complex ones.

The computer-based psycho-social dictionary DICTION[39] analyses semantic features of text based on 31 disjoint dictionaries containing around 10,000 words. Optimism is one of the five main constructs calculated by DICTION, and is in turn based on six of the disjoint dictionaries ([Praise + Inspiration + Satisfaction]—[Blame + Hardship + Denial]).

For each document, raw totals (number of words per category), document frequencies and standardized scores are calculated. To make raw scores comparable across publication types, all numeric results have been converted into Z-scores, using mean scores for IPCC SPMs as a benchmark. Namely, for the entire sample, the difference between the mean score of IPCC SPMs and the score of each individual document, divided by the standard deviation, has been used as the final measure for each document. Polysemy, that is, the occurrence of words or phrases with different but related meanings, is treated via simple statistical weighting: polysemic words produce multiple score types, proportional to the average use of the senses in texts, which are all taken into account.

For the comparison of relative frequencies of DICTION terms (Table 1), we initially calculated raw frequencies of all terms included in the DICTION optimism/ pessimism dictionaries for all four publication types. These raw frequencies were subsequently expressed as a percentage of the sum of all occurrences of any of the terms listed in the dictionaries. The relative frequencies referred to in Table 1 then denote the difference between the frequency of a term (expressed as percentage) in a given publication type compared to its frequency across all four publication types. To calculate average frequencies across the entire sample, frequencies for the four publication types were weighted equally to avoid bias towards quality newspapers as by far the largest individual subsample ($n = 707$): $\Delta f_{SPM} = f_{SPM} - (f_{SPM} + f_{Science} + f_{Quality} + f_{Tabloid})/4$.

All boxplots in the figures show median scores, upper and lower quartiles, as well as minimum and maximum scores for each publication type. Kruskal–Wallis tests were conducted to assess the significance of the differences in mean scores; follow-up pairwise tests, applying Bonferroni corrections to control for Type I errors, were employed to identify significant differences between subsamples.

For the FRE score (Fig. 1) we identified clear significant differences in mean scores between publication types (χ^2 (3, $N = 1{,}024$) = 175.2, $p < 0.001$). Significant differences were found between each of the subsamples ($p < 0.001$), but not within any of the four subsamples. Over time (Fig. 2) we identified significant differences between means of FRE score for the entire sample between the five assessment periods (χ^2 (4, $N = 1{,}024$) = 68.1, $p < 0.001$). We also found significant differences between AR4 and all other assessment reports ($p < 0.001$ for all pairwise tests involving AR4) as well as AR5 and all other assessment reports except AR3 ($p < 0.05$ for pairwise tests with AR1 and AR2). Of the four publication types, scientific publications as well as quality newspapers showed significant differences in mean FRE scores (scientific publications: χ^2 (4, $N = 240$) = 25.1, $p < 0.001$; quality newspapers: χ^2 (4, $N = 707$) = 27.7, $p < 0.001$). In both cases, follow-up pairwise comparisons showed significant differences ($p < 0.05$ or lower) for AR4 with respect to other assessment reports (scientific publications: AR3 and AR5; quality newspapers: AR1, AR2 and AR5).

For the DICTION optimism score (Fig. 4) we identified clear significant differences between publication types (χ^2 (3, $N = 1{,}024$) = 31.1, $p < 0.001$). Follow-up tests showed significant differences between all publication types, except between tabloid and quality newspapers, as well as between SPMs and scientific publications. No significant differences in mean optimism scores could be identified within any of the four subsamples. Over time (Fig. 5), significant differences between means of different types of media and the IPCC SPMs mean were identified between the five assessment periods (χ^2 (4, $N = 1{,}024$) = 14.8, $p < 0.01$). We also found significant differences ($p < 0.01$) between AR1 and AR4 as well as AR1 and AR5. Of the four publication types, only quality newspapers showed significant differences in mean optimism scores (χ^2 (4, $N = 707$) = 13.2, $p < 0.05$) between the five assessment periods. Significant differences ($p < 0.05$) between AR1 and AR4, as well as AR1 and AR5, were also found.

The research design is subject to a number of limitations. As a consequence of the text mining approach used to identify relevant articles, the sample includes not only articles exclusively focusing on the IPCC, but also coverage of other issues whereby the IPCC is only mentioned in passing. Furthermore, newspaper syndication and the influence of news wires might have biased readability and optimism scores for quality and tabloid newspaper coverage. In addition, there are two limitations linked to the use of DICTION. First, results might be distorted based on the existence of homographs[40]. For this reason, other DICTION constructs, such as its certainty score, could not be considered for this analysis. Second, DICTION has been developed in a US context and can be considered as most suitable for US-based publications. Although British English spelling was converted into American English spelling as part of pre-processing of files, construct validity might still be slightly lower for UK-based coverage.

In addition, the analysis focused on plain text versions of the documents and as such did not consider the potential impacts of illustrations or different types of formatting. Finally, the linguistic analysis was performed only on English language content, given that DICTION is limited to English language text and readability scores for other languages would not be comparable. Nevertheless, it should be kept in mind that although IPCC SPMs are published in various different languages, the English language version is the one agreed at the Plenary before it is subsequently translated into other languages.

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Advance paper 14

A new science-policy interface
The Structured Expert Dialogue of the 2013-2015 Review of the UNFCCC

Advance paper for IPCC Expert Meeting on Communication (9-10 February 2016, Oslo, Norway)

Andreas Fischlin[1], February 2016

Abstract

The Structured Expert Dialogue (SED) of the 2013-2015 Review of the UNFCCC held from 2013 to 2015 was a multi session, fact-finding, face-to-face exchange of views between UNFCCC Parties and experts, discussing policy options and policy making questions, based on the best available knowledge. The SED constitutes a new, promising science-policy interface informing not only the policy makers better, but also inspiring experts and scientists for providing more useful policy relevant material in more adequate forms.

Contents

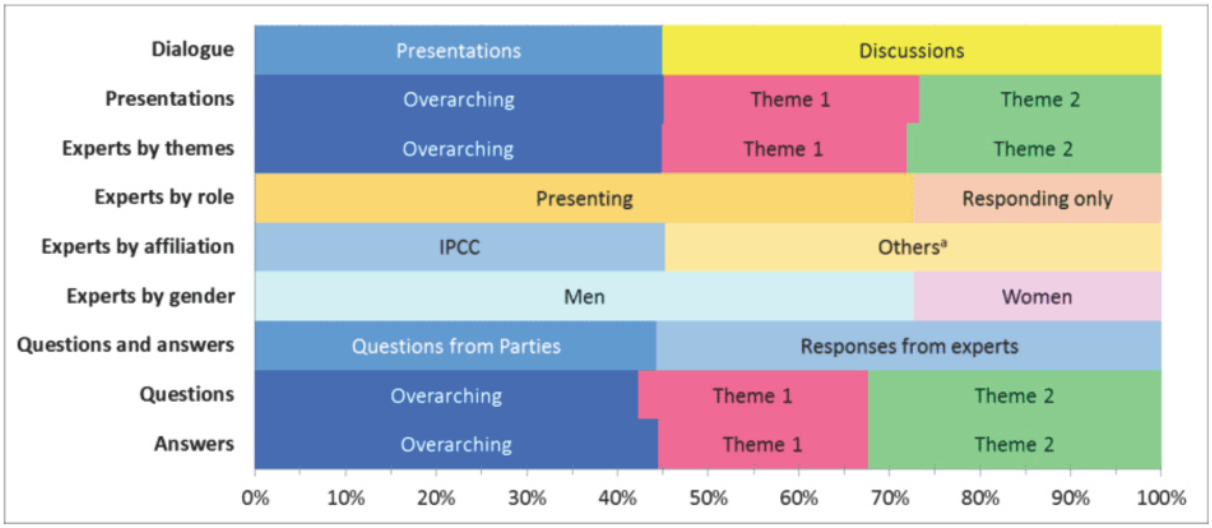
1 SOME FACTS

After the COP15 in Copenhagen 2009, where Parties could not agree on a Long-Term Global Goal (LTGG) of limiting mean global warming to 2°C above pre-industrial levels, governments agreed at COP16 in Cancun 2010 to pursue such a LTGG, but only if this LTGG would be periodically reviewed, preferrably in harmony with IPCC assessment cycles. This first review took place in form of the 2013-2015 Review and had a mandate to consider also the possibility to strengthen this limit to 1.5°C. That review consisted of two parts: The Structured Expert Dialogue (SED) and a negotiating part (joint contact group of the two subsidiaries bodies of the UNFCCC, SBSTA and SBI).

[1] IPCC Vice-Chair WGII, Co-Facilitator of the Structured Expert Dialogue of the 2013-2015 Review of the UNFCCC. Terrestrial Systems Ecology, Environmental Physics, Institute of Biogeochemistry and Pollutant Dynamics (IBP), Department of Environmental Systems Science, ETH Zurich, Universitätsstr. 16 – CHN E21.1, 8092 Zurich, Switzerland, ***www.sysecol.ethz.ch*** ***andreas.fischlin@env.ethz.ch***

Over the course of the last three years the SED consisted of 4 meetings, several spanning several days and each was devoted to particular themes. Guiding questions sent to participants in advance, based on submissions made by Parties, were used to structure a dialogue among 73 invited experts and delegates from Parties and observers on latest scientific findings as relevant for policy making. These discussions were life videocast, recorded, and the co-facilitators with the support from the UNFCCC secretariat summarized them in reports made available after each meeting. Finally co-facilitators were mandated to prepare a technical summary together with a compilation of all discussions, i.e. the previously published summary reports. This final SED report was presented to the UNFCCC subsidiary bodies (SBSTA, SBI) as of 2nd June 2015 and served as a basis for the negotiations on the Paris Agreement and the decisions taken at the last COP21 in Paris.

Following statistics show how SED discussions were organized as fact-finding, face-to-face exchanges of views between Parties and experts.



During the 4 meetings taking place at 5 locations during 11 days, 60 presentations were made and used as a starting point to launch discussions[2].

2 A NEW SCIENCE POLICY INTERFACE

The SED was perceived nearly unanimously as serving its purpose well. The final SED report[3] contained ten messages, each with a headline and being made easily accessible within boxes inside the 30 page summary as prepared by the two co-facilitators. Here the headlines of the ten messages:

1) A long-term global goal defined by a temperature limit serves its purpose well

[2] Details are available in Annex V, p. 180 of the final SED report (see next footnote)

[3] FCCC/SB/2015/INF.1 available at http://unfccc.int/6911.php?priref=600008454

2) Imperatives of achieving the long-term global goal are explicitly articulated and at our disposal, and demonstrate the cumulative nature of the challenge and the need to act soon and decisively

3) Assessing the adequacy of the long-term global goal implies risk assessments and value judgments not only at the global level, but also at the regional and local levels

4) Climate change impacts are hitting home

5) The 2 °C limit should be seen as a defence line

6) Limiting global warming to below 2 °C is still feasible and will bring about many co-benefits, but poses substantial technological, economic and institutional challenges

7) We know how to measure progress on mitigation but challenges still exist in measuring progress on adaptation

8) The world is not on track to achieve the long-term global goal, but successful mitigation policies are known and must be scaled up urgently

9) We learned from various processes, in particular those under the Convention, about efforts to scale up provision of finance, technology and capacity-building for climate action

10) While science on the 1.5 °C warming limit is less robust, efforts should be made to push the defence line as low as possible

While above headlines provide a gist of the content of the dialogue (the topmost tip of the iceberg only), the purpose is not to replace the wealth of information contained in the underlying report, but to provide an easier overview and to enable a faster access to all the information contained in the 182 page report and the actual discussions summarized there. To this end the report is full of cross-references, and all figures and other material is referenced to the original sources, notably the latest IPCC reports (AR5), including IPCC special reports prepared during the AR5 assessment cycle, and other reports as prepared by invited international agencies and UNFCCC bodies. This allows for any reader to trace statements back to the referenced original data source and scientific research.

3 Lessons to be learned

Presentations were planned to use up only about a third of the 34.5 hours as allocated for the dialogue. While this goal could not be achieved as planned, this planning effort resulted nevertheless in spending more hours for discussions than for presentations, quite a critical aspect of the SED. A fruitful dialogue requires sufficient time so that quick question-answer cycles become possible, which give participants an opportunity to ask follow up questions. Moderation has to pay careful attention to such aspects.

Fourth meeting of the Structured Expert Dialogue (SED) discussing IPCC SYR AR5 during COP20, Lima, Peru, 2nd Dec. 2014 © 2014, IISD

Another important element for making such a dialogue really a new science-policy instrument, that may carry heavy weighted and substantive information, is to strengthen this bridge by:

- Input sources are determined upfront and need legitimation, e.g. IPCC was decided to be a key input (COP decisions), while clear information on origin, including breadth and depth, of inputs has to be provided to participants for evaluating the robustness of the information
- Guiding questions based on stakeholder inputs (e.g. Party submissions) need to be prepared in advance, help the organizers to choose which experts to invite, inform the experts and finally guide the content of the presentations
- Redundancy in presentations is to be avoided (no slide shown twice)
- The dialogue needs a comprehensive, balanced, and consistent orchestration over several seesions, making it possible for stakeholders to intervene between sessions and formulate further written inputs and the co-facilitators to adjust the dialogue accordingly
- True dialogue is fostered, which will in the end inform not only delegates but also the experts
- The dialogue needs to be broadcasted and recorded (not the least to make accurate post analysis possible) and presentation slides can be watched while viewing/listening a broadcast; finally all presentations are made available in full and recordings with slide synchronisation can be revisited to ensure full transparency of the proceedings
- The dialogue of a session needs to be summarized after each meeting in an accurate and carefully balanced manner
- Every summary needs to be peer-reviewed by experts and professional editors
- To fulfil its mandate the entire dialogue should be completed by an effort to summarize all, e.g. by identifying common, emerging topics, including possible answers to the set of guiding questions

A key aspect is that a true dialogue is enabled and takes place, i.e. the deficit model of unidirectional communication is abandoned, so that in depth, comprehensive, and policy relevant insights are generated through the dialogue. Otherwise neither the decision makers nor the experts can gain much in terms of truly added value.

Advance paper 15

New Strategies in Science Communications
Paul Lussier

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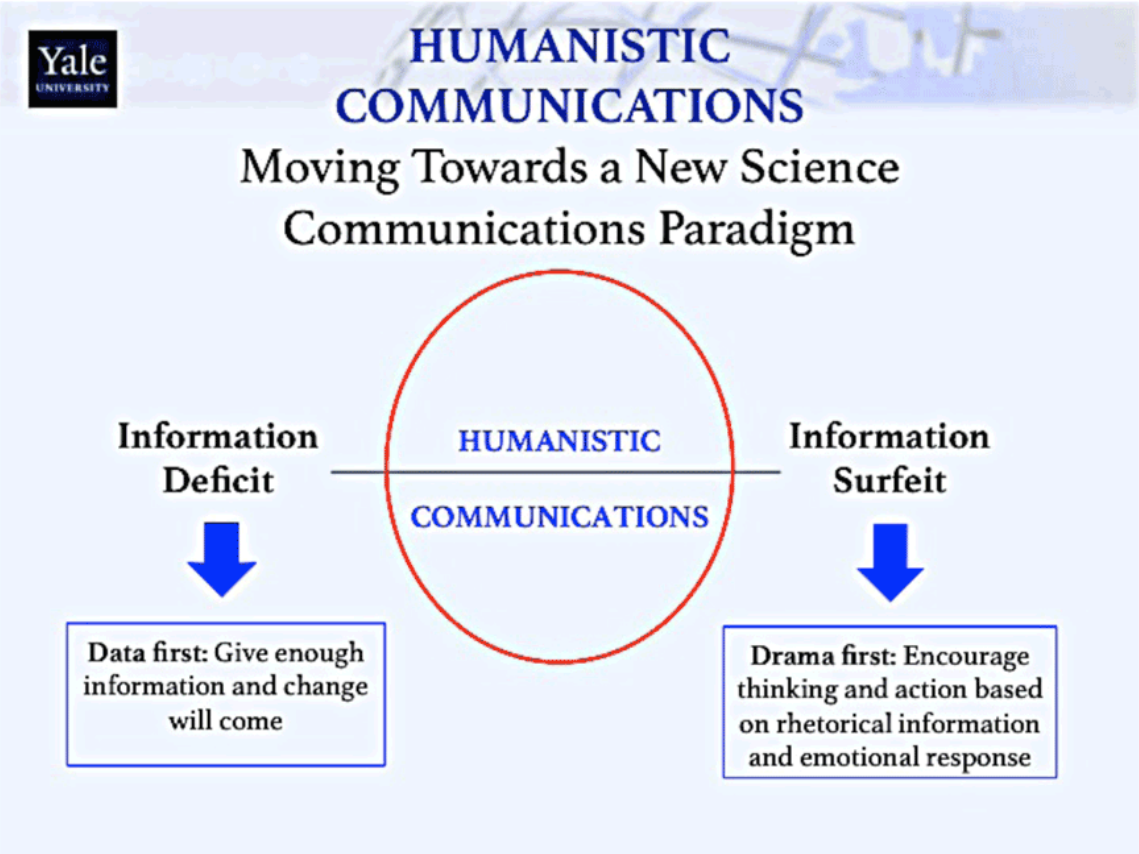
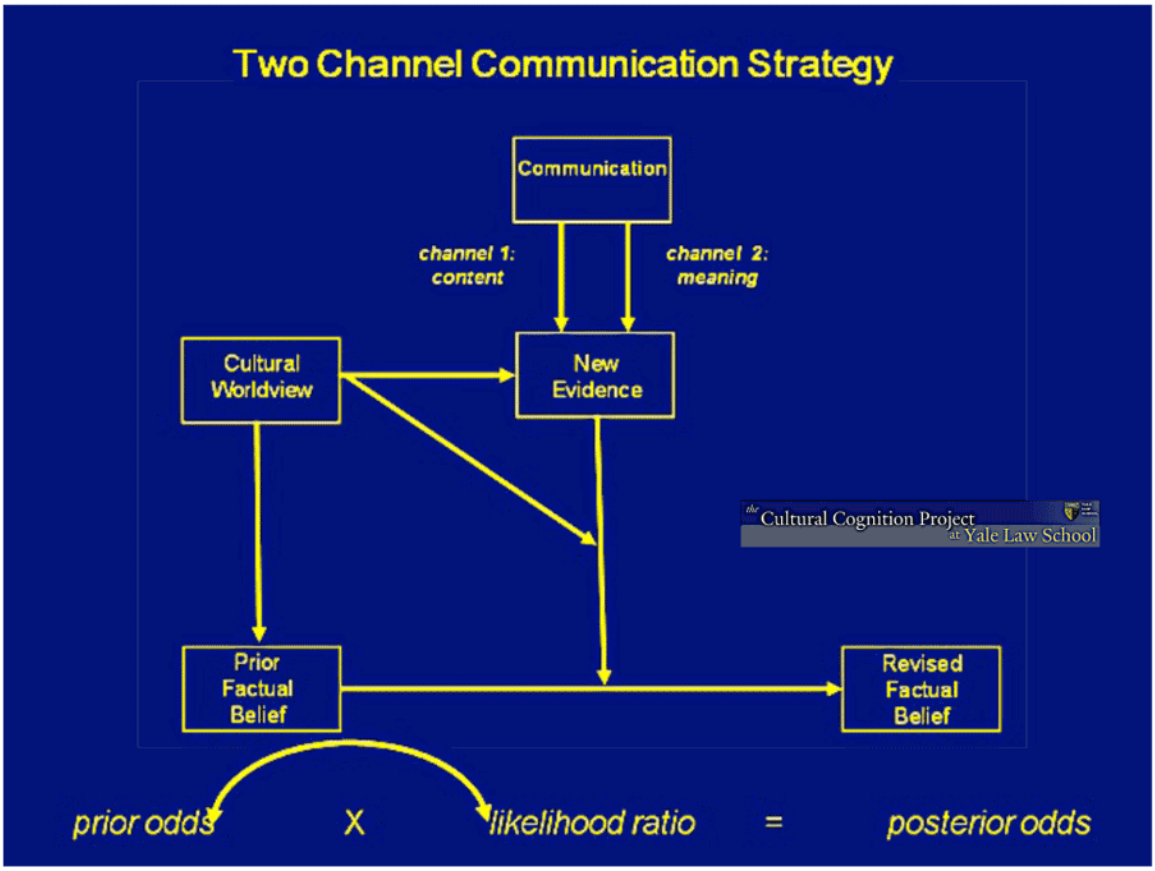
New Strategies in Science Communications

A discussion of new strategies in communications in development at universities and research institutions worldwide, spearheaded largely by Yale University, this approach builds "pathways of narrative coherence" and seeks to develop a new foundation of engagement between scientists and stakeholders for purposes of facilitating science understanding, activation, and uptake.

The discipline, called Humanistic Communications, sets out an ambitious, holistic framework for research and capacity mobilization. Central to achieving the vision is a commitment to co-design and co-produce knowledge in collaboration with societal partners -- including science, policy and media institutions -- in order to facilitate solutions that better respond to the sustainability challenges facing society.

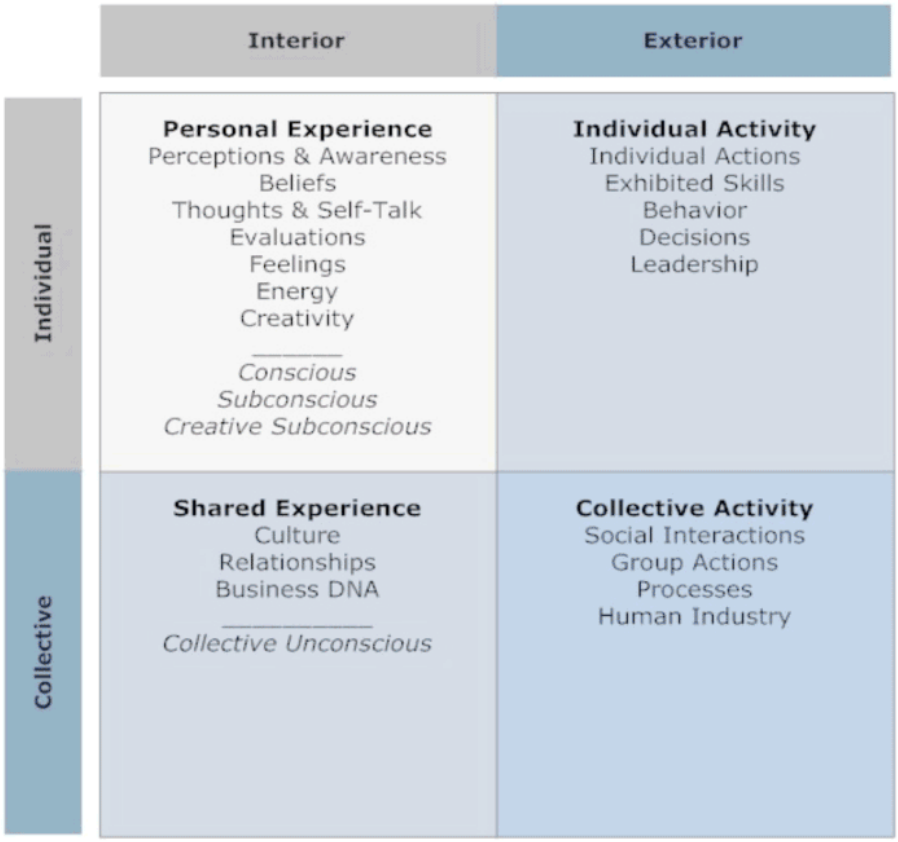
Increasingly, the scientific community is seeking ways to engage with diverse decision-makers in government, the private sector, and civil society, and humanistic communications is offered as a method and framework to facilitate that process, and to deliver the products and services that society needs to address global sustainability challenges.



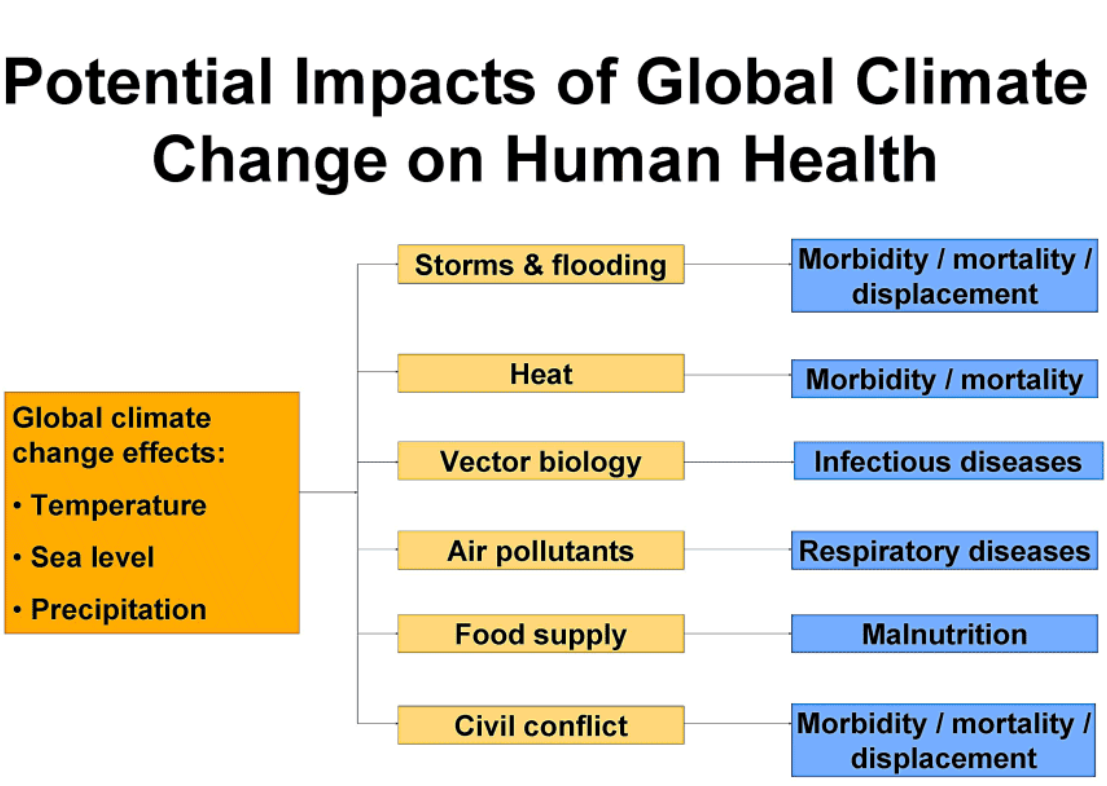


Defining Language Determinant Science and Other Sectors

SCIENCE	MEDIA	POLICY	BUSINESS	BELIEF
Accurate	Dramatic	Realistic	Actionable	Archetypal
Qualifying	Engaging	Speaks to Need	Speaks to Revenue	Circumscribing
Highlight Uncertainty	Highlight Certainty	Highlight Risk	Highlight Benefit	Highlight certainty
Cautious	Certain	Careful	Candid	Anthemic
Build Case for Further Research	Build Audience and Interest	Build Constituency	Build Business Case	Build following
Objective	Persuasive	Popular	Visionary	Persuasive
Generate Understanding	Generate Ratings	Generate Momentum	Generate Shareholder Interest	Generate action
Steer Clear of Policy	Commit to a Conclusion	Commit to Policy Recommendations	Build Science-Based Business Scenarios	Community Ethos



Source: Ken Wilber, *Wicked Problems*



Advance paper 16

Outreach activities related to the IPCC AR5 in Germany

Christiane Textor, German IPCC Coordination office

Key messages and main challenges

- Communication at national level is essential, in particular in non-English speaking countries.
- Explaining the IPCC as an institution builds trust in its messages.
- Outreach can benefit from exchange, coordinating or cooperating with other agents at national level.
- The release of the AR5 in four parts was difficult to explain, and attention decreased with time.
- There is a strong demand for translations into German allowing access to the report for a wider public.
- Provision of derivative products facilitating access to the AR5 to a wider audience of non-specialists in an accessible language while maintaining the scientific rigour is very challenging.
- Both translations into German and derivative products require cooperation with IPCC experts to correctly reflect technical terms and the carefully drafted, Panel-approved expressions of the SPM.

General objectives of outreach activities

- Inform about the key messages of IPCC reports.
- Raise awareness of the challenges of climate change and potential solutions.
- Explain how the IPCC works and why it provides credible, objective and comprehensive information (policy-relevant but not policy-prescriptive).

Targeted audiences

- Interested public and relevant stakeholders, media, academia, government departments and agencies.

Permanent activities

- Strong support from government referring to the IPCC as the scientific basis for climate politics.
- German IPCC-Coordination Office (De-IPCC) as a general entry point for IPCC-related issues:
  - Responding to a variety of email requests:
    access to reports, translations, and figures; information on content, identification of experts.
  - German IPCC Website (www.de-ipcc.de):
    information about the IPCC's mandate and processes, access to reports and translations, news.
  - Oral presentations on many occasions:
    e.g., public, universities, schools, government departments and agencies, media.
  - Meetings at the interface of science, policy, and the public:
    annual meeting of the German "IPCC-community" and specific occasions to foster mutual understanding, to inform about climate science, and to build trust in research in general and in the IPCC process in particular.

Activities before the release of the AR5

- Facilitating and encouraging exchange between relevant players in Germany (government agencies, research associations, climate services, public relations of research institutions, NGOs) on outreach strategies and measures with the aim to coordinate and explore synergies of independent agents.
- Government and agency briefings on the review process and AR5 key messages.
- NGO briefings on the IPCC's processes and mandate, and on climate science.
- Online brochures on 1) IPCC's mandate and processes, 2) the AR5, 3) German IPCC-Coordination Office.
- Press briefings with researchers and government officials (by German Climate Consortium (DKK)).

- Responding to an increasing number of various requests from the media.
- Interviews of government representatives on the IPCC (e.g., Spiegel, 13 Sep 2013).

Activities shortly before or during the approval sessions

- "Outlook Earth" (8 page insert to the magazine of the German journalists' association on topics related to global change research (ca. 45,000 copies, later secondary use): three issues focusing on IPCC, after WGI, WGIII and SYR approvals with core messages of the reports and related climate change research.

Activities immediately upon each approval of the WG-contributions and the SYR

- Joint press releases of the federal ministries of the environment (BMUB, IPCC focal point) and of research (BMBF).
- 2-4 page explanatory summary of the key messages in German to facilitate a fast access to reports for the general public and the media, published by BMUB, BMBF, Federal Environment Agency (UBA), De-IPCC, reviewed but not authorized by German lead authors.

Activities on the next working day after approval in Berlin

- Federal Press Conferences with ministers of BMUB & BMBF, German main IPCC authors after WGI, WGIII (covering both WGII and WGIII), and the SYR.
  - Information on the core messages of the report.
  - Raise awareness of the challenges of climate change and potential solutions.
  - Link the messages of the report to the German national and international climate policy.
  - Show the contributions and the relevance of German climate research for the IPCC.

Activities two days after release in Berlin

- Following WGI and WGII: Discussion forums with BMUB & BMBF ministerial officials, German main IPCC authors, and relevant stakeholders.
  - Information about the core messages of the reports.
  - Discussion about the implications of the reports for climate/energy politics and research in Germany.
  - Information about the IPCC as an institution, its processes and mandate.
  - 250 key stakeholders (academia, government, agencies, economy, civil society, NGO, and media).
- Following WGIII: Launch event of the report ("Science & Policy: Exploring Climate Solutions") with IPCC Chair, WGII & WGIII Co-Chairs, Deputy Federal Chancellor and Minister for Economic Affairs and Energy.
  - Information about the report's core messages, implications for German climate and energy policy.
  - More than 1000 participants from academia, government, agencies and key economy/business, civil society, NGO, and media.

Activities in the months/years after the release

- Translation into German of SPMs, SYR, WGI headline statements, FAQs, Glossary (Germany, Switzerland, Austria).
- Easy-to-understand brochure on the main contents of the AR5 for the general public (De-IPCC & UBA).
- Information on IPCC and AR5 on the websites of relevant ministries and agencies.

Support for outreach activities of German IPCC authors

- Response to media requests for author contacts, no further coordination.
- Travel support for AR5-related outreach activities addressing policymakers and relevant stakeholders.

Linked science communication

- MOOC on climate change of the DKK and WWF with more than 6000 subscriptions.

Advance paper 17

Seven recommendations for improving IPCC communication and policy impact

Asunción Lera St.Clair[1], James Painter[2], Erlend Hermansen[3], and Christian Bjørnæs[4]

In this paper we sum up the main conclusions and recommendations from a research project[5] that that has followed AR5 from publication to policymaking in five European countries: UK, Norway, Spain, Netherlands and Poland.

1. Acknowledge that there is no straight line from science to policy.

Our point of departure is that there is never a linear relation between science and policy or between science and users, that language, framing of issues, and institutions do have critical importance. It is within this complex setting where we see a potential improvement of *communication*, as part of a wider effort to understand how the different contexts and national policy traditions have enormous influence on how scientific information is received.

2. Pay attention to contexts – use focal points as communication hubs.

Contexts matter – and are usually decisive. An analysis of the policy contexts in the different countries has revealed a huge variance, from coal-dependent and reluctant Poland, to the UK with its Climate Change Act, oil-rich Norway, and to Spain still coping with the economic crisis. Although climate science is assessed and synthesized by a global community, the uptake is local, conditional to cultures and socio-economic and political particularities. Similarly, an analysis of the institutional setting of the IPCC focal points revealed large differences between the countries, from meteorological offices to environmental protection agencies to Ministries. This diversity of institutional settings has consequences for how the climate issue is institutionalized in different countries, the IPCC Focal Point's role as boundary organization and for their role as communicators of science results to policy and to the public. Focal points can be a valuable hub for improved communication of IPCC results in different countries, with Norway as a leading example.

3. Risk language is effective.

Each Working Group's SPM reflects not only the WG distinctive mandate but also a distinctive intellectual framing, reflected in differences in categories, vocabulary, and scope of attention. Although there is a predominance of natural sciences language and logic, the Synthesis Report offers a unified narrative framed as risk, implying not just an unknown outcome but possible damage to important human values. There are major absences, such as a thin understanding of critically important human factors. Human factors are important for communication and uptake.

4. SPMs are great science products but low quality communication tools.

Interviewees convey that the Summaries for Policymakers (SPMs) are perceived as high quality science reports used for many different purposes from policy formation to awareness raising. The general view of the interviewees is however that they are low quality communication tools, where the language and figures are difficult, complex and too scientific for policymakers. Much more attention needs to be paid to the clarity and accessibility of the language used for policymakers and other non-expert audiences.

[1] Senior Principal Scientist, DNV GL, Strategic Research and Innovation, Climate Change Programme.

[2] Director, Journalism Programme, Reuters Institute, University of Oxford.

[3] Researcher, Center for International Climate and Environmental Research-Oslo (CICERO).

[4] Director of Communications, Center for International Climate and Environmental Research-Oslo (CICERO).

[5] The research project is called *AR5 in Europe: Usability, Framing and Communication of Scientific Information.* is a Fast Track Initiative of JPI Climate supported by the Norwegian Research Council.

5. IPCC would benefit from the use of professional writers.

Both advantages and risks are entailed in bringing in professional writers. However, there are many specialists available who know and respect the primacy of the science. Procedures and safeguards can be put in place to ensure the appropriate clarity of roles for such writers. We suggest that specialist writers and communicators should be introduced early as part of the writing and reviewing process. Clearly, scientists and governments should have the final sign-off.

6. Derivative products and targeted reports work.

To increase the policy relevance of IPCC knowledge, important users (such as the private sector) must be involved at earlier stages, for instance in the scoping process. The IPCC should consider supporting external actors in producing derivative products, a process that seems effective for increasing the usability of IPCC knowledge. There is also a demand for more targeted reports.

7. Learn from other experiences and research.

The IPCC as a whole, including the communications team, needs to draw more heavily and in a systematic way on the experiences gained from designing, producing and communicating other reports, including social science research on these topics.

Advance paper 18

Some ideas

Jill Peeters, weather presenter, Belgium

The people most sought after in Belgium to comment on climate disruption or extreme weather are:

- former vice-chair of the IPCC, Jean-Pascal van Ypersele
- DG for Climate Action European Commission, Jos Delbeke
- weather presenter and meteorologist, Jill Peeters
- other scientists, or people of the national Met Office KMI, but not so well known by the public
- politicians, but not so trusted by the public

I am the weather presenter at VTM (commercial channel in Flanders) and *Het Laatste Nieuws* (most popular newspaper). In 2006 I started communicating about climate disruption. In this presentation I will show pictures and clips, showing some examples of my work, since the launch of AR5.

Looking for momentum: the launch of AR5-WGI

As scientists, we think that it's important to get science into the news. But in fact media is only interested in this climate background, when people suffer from big disasters (extreme weather). I decided to come over to Stockholm, at the outcome of the AR5, by myself. It was only a few days before the launch, that my news department was convinced that we could create a unique momentum. (in fact: the other channels weren't going, and they don't have a popular climate communicator) There was a live satellite intervention in the news, I also gave some radio interviews, and tweeted about it. I was able to arrange a live interview with JP van Ypersele about the importance of the AR5, but there was not enough time to go into depth. Papers tried to the next day…

But they communicated that "we're all gonna die and it is our own fault". Without having the opportunity to read the AR5 in depth, I had to defend the finding that 'the figures are overwhelming and they don't lie'. Papers and other media focused on the extremes, without any balance, ignoring uncertainty or different model outcomes of ranges.

Although the AR5 WGI results are more general, focused on the physics, it is the most cited. Based on this a lot of press translated these WGI general figures into local ones. Again, without any respect for the scientific procedures. They made up their own science, just focusing on the 'what's in it for me' side. I could help some journalists with this, trying to put more nuances into the communication, and adding the importance of doing this.

With the support of two dedicated authors I managed to write a book (which came out in December 2014!). This was based on the IPCC AR5 findings, and written with 'an 18 year old' in mind. In 21 questions we tried to answer all the basics of climate disruption. 7 questions in part one 'what is happening' (WGI), in part two 'how come?' (WGII) and in part 3 'what can we do about it?' (WGIII). With a focus on the importance of national policy and international co-operation (COP21; UNFCCC). Jean-Pascal van Ypersele and Philippe Huybrechts from the IPCC wrote forewords, also Thomas Stocker IPCC Working Group I) and Maarten Van Aalst from Red Cross/Red Crescent Climate Centre helped me out. All questions were answered, starting with an original IPCC graphic. Again, especially WGI graphics were useful, although there is most of the time too much information in one graphic.

Giving lectures I started using my own graphics and cartoons, and free-to-download clips or graphics from Climate Central, NOAA, NASA…

Besides giving interviews on my own channel during the news on radio and TV, I am often invited by the national channel to do the same. But this always starts with extreme weather events. The only exception was COP21 in Paris. I also made a 2050 weather report for the WMO. This was covered by the whole Belgian press, and is still used very often in schools and government. (Not only because of the content, but also because 'the WMO/UN invited our weather presenter to do so'.)

My channel owns a children's channel too, and there we made 8 episodes on climate. We chose the subjects based on AR5, but didn't communicate it as such. The children trusted my explanations, because they link a weather presenter with climate knowledge.

I used to tweet more climate scientific information. But more and more I'm convinced this doesn't help people at all. It creates a discrepancy between the world people would like to live in (without weather disasters, climate refugees, no air pollution…) and reality (traffic jams, energy bills, taking a plane…). I started focusing my communication on good stories, simple choices, opportunities, progress…

By the way: I prefer the phrase "climate disruption" instead of "climate change" or "global warming".

Advance paper 19

Submission from the Quaker United Nations Office
Submitted by Lindsey Fielder Cook on behalf of the Quaker United Nations Office

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The following reflections were prepared for the IPCC Experts Meeting on Communication

Background

The Quaker United Nations Office (QUNO) is an observer at the UNFCCC, and since 2013 has offered 'quiet diplomacy' with negotiators to help build communication and understanding between diverse groups of countries. In this work we stress the call to act for humanity and the urgency of what science is telling us, since the UNFCCC negotiations are often more influenced by economic competition than by climate science.

In our work outside the UNFCCC we have organized meetings, known as 'quiet conversations', with international organizations, faith and grassroots communities, to engage ethical questions with climate science. Some of the meetings have involved an IPCC scientist, and this collaboration with the IPCC has also enabled us to write accurate yet more 'simplified' summaries of recent climate science findings.

From these experiences we encourage the upcoming 6th Assessment Report to better reach the hearts and minds of the 'average person'. By this, we mean the citizen who is not versed in technical or scientific language and has likely never heard of the IPCC, yet whose understanding of the climate crisis, the root causes and need for transformation, is essential if humanity is to avoid catastrophic global climate change. To do this, we suggest an additional publication which relays technical and scientific information in a clear and relevant way, including most relevant statistics/percentages and language that connects to human emotions. This would more likely inspire personal and collective responsibility to ensure that the poorest and most vulnerable peoples now, and all our future generations, do not suffer profoundly as a consequence of our actions.

IPCC Strengths

- The IPCC seems increasingly successful in collating the latest climate science (etc.) to a level that withstands criticisms of the science.
- The IPCC assessment reports are clearly seen as the most extensive and thorough publication of available climate science findings, critical to organizations like QUNO which engage with anthropogenic climate change.
- The IPCC can address the root causes and drivers of anthropogenic climate change, in a way that moves beyond the political and economic agendas, including the role of fossil fuels (information otherwise easily influenced by financial interests) and objective analysis of other drivers, including land use practices, economic growth and population growth.

IPCC areas to strengthen

- Harsh and personally wounding criticism from climate change deniers has likely had a traumatic effect on climate scientists.
- Authors may feel 'safer' to stand behind lengthy technical language to more effectively cover all aspects of a scientific finding.
- Scientists may become quickly uncomfortable when findings are 'simplified' or put into non-technical language, yet technical language can mask an emotional connection with the urgency of the situation.
- Without an emotional connection, it is harder for people to relate personally, in turn to act.
- For transparency with the general population, the assessment reports could better clarify how Governments can and cannot influence content in the reports.
- Need for more clear and simple information which can empower the 'average person'/citizen, specifically: what is happening, how bad it is, vision of what urgent action for a healthier future can achieve, and what contributions an individual can offer.

Suggestions for the AR6: A Summary for the Citizen

- Continue with the depth of quality of information, even length where necessary, as the 'rock' of evidence.
- Clarify what States are permitted to do, and not do, in editing the IPCC drafts.
- Create additional, simplified, 'Summary for the Citizen' which will also benefit policy makers, who often need a more concise 'story' with clear statistics to convince their Ministries.
- Do not be afraid – state clearly where we are and how bad it is (symptoms of RCP 8.5). Too often scientists and government officials appear reluctant to speak about the threat to human civilization before us.
- Clearly state what is different to natural climate change, including speed of change, and its connection with other crises in biodiversity, oceans, land use, etc.
- Explain in detail relevant to daily life, which human activities drive the rise in GHG emissions.
- Explain in practical language how individual action (when multiplied), can make a difference. Clear and simple information – including percentages/statistics – that can help support discussions 'over the dinner table'.
- Be clear about the urgency and radical action needed (to reach RCP 2.6).
- Engage more in the non-scientific, non-technical 'fixes', that is, more sustainable, healthy lifestyles that do not drive GHG emissions. This would also encourage policy makers to talk about living sustainably as critical to avoiding dangerous climate change. Governments often fear that needed regulation will not be supported.
- Be very wary of emphasizing the role of technologies, such as carbon capture storage, which can justify inaction by those who gain financially from maintaining reliance on fossil fuels (and other significant contributing human activities). Citizens need to hear the message that technology alone cannot fix everything – changes in lifestyle (which might also be supported by technology) are needed.
- Empower the citizen
    - This is a challenge we can face.
    - Our actions to stem climate change will help heal other environmental crises, including biodiversity, land use and biogeochemical pollution.
    - Our actions will help save vulnerable communities now and all future generations.
    - Our actions will protect Nature, on which our lives ultimately depend.

Annex 1: QUNO prepared the following paper for distribution at the UUNFCCC COP 21, in Paris.

What climate science tells us (briefly):

1. Between 1880 and 2012, **global mean surface temperature warmed 0.85°C.**[1]

2. **Our greenhouse gas (GHG) emissions rate is currently above**[2] **RCP 8.5**, the highest scenario of the 5th Assessment Report, placing us on track for **global mean surface temperature rise of up to 4.8°C** by 2100 compared to pre-industrial levels.[3]

3. **This rate of global temperature rise would be, to the best of scientific knowledge, unprecedented in our human history**. Warming between the last ice age and the current warm period, about 20,000 to 10,000 years ago, was approximately 0.5°C to 1°C rise in global mean surface temperature per 1,000 years.[4]

4. **The levels of carbon dioxide, methane, and nitrous oxide concentrations in Earth's atmosphere are unprecedented in (at least) the last 800,000 years.** CO2 concentrations have increased by 40% since pre-industrial times.[5]

5. **Since 1951, human activities have been responsible for the majority of warming** [6]. These activities include fossil fuel energy production, forestry and land use, intensive and animal agriculture, industry, transport, and buildings.[7] These human activities, reflecting our lifestyles and behaviours, are the 'root causes' of anthropogenic climate change.

6. **Population growth and, more significantly, economic growth, are the most important drivers** of increases in CO2 emissions[8]. Since 1970, emissions of CO2 from fossil fuel combustion and industrial processes contributed to about 78% of the total GHG emission increase.[9]

7. **As CO2 lasts for approximately 150 years, we have less than ten years at current GHG emission levels to limit warming to under 1.5°C.**[10] A 1.5°C rather than 2°C temperature rise target could significantly influence the survival chances of the most vulnerable communities.[11]

8. **About half of the anthropogenic CO2 emissions between 1750 and 2011 have occurred in the last 40 years.**[12]

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[1] Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, Working Group I, 'The Physical Science Basis', Summary for Policy Makers, page 3, https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5_SPM_brochure_en.pdf
[2] Glen P. Peters, Robbie M. Andrew, Tom Boden, Josep G. Canadell, Philippe Ciais, Corinne Le Quéré, Gregg Marland, Michael R. Raupach and Charlie Wilson (collaboration of the Global Carbon Project) in Nature Climate Change, online publication, 2 December 2012, p.2
[3] Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, Working Group III Summary for Policy Makers, p.8 http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf
[4] Jeremy Shakun, et all, *Global Warming Preceded by Increasing Carbon Dioxide Concentrations During the Last Deglaciation*, Nature, 5 April 2015, Volume 484, p. 49-55, and Shaun Marcott et all, *A Reconstruction of Regional and Global Temperature for the Past 11,300 Years*, Science Mag, 8 March 2013, Volume 339, p. 1198-1201.
[5] Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, Working Group I, 'The Physical Science Basis', Summary for Policy Makers, page 9, https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5_SPM_brochure_en.pdf
[6] Climate Change 2014, The Synthesis Report, p.5 http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf
[7] Ibid, p.88.
[8] Ibid, p.5
[9] Ibid, p.5
[10] Ibid, p.64
[11] http://unfccc.int/resource/docs/2015/sb/eng/inf01.pdf
[12] Climate Change 2014, The Synthesis Report, p.4 http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

9. The **oceans have absorbed more than 90% of the energy** accumulated between 1971 and 2010, and about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification which **compromises marine eco-systems**.[13]

10. **The Arctic is experiencing the fastest rate of warming**. This results not only in the melting of ice sheets, which raise sea levels, but also in the melting of permafrost, which releases both CO2 and methane, leading to greater levels of warming.

11. Human activities resulting in climate change also contribute to planetary process crises in biodiversity (number of living species), biogeochemical flows (nitrogen in particular), and land use change.[14] **We are experiencing the highest species extinction rate in human history. These crises are inter-linked; action to reverse one crisis can positively help other crises.**

12. **Current GHG emission levels, unless substantially reduced, will undermine our water resources and our ability to grow food and work outdoors,[15] threatening the collapse of eco-systems and thus the long term survival of our current human civilization**.

13. **We have a choice.** We still have time to ensure warming below 2°C in this century, if we commit up to 70% GHG emission reductions by 2050 (compared to 2010) and near zero or below by 2100.[16]

14. **Near zero anthropogenic GHG emission by 2050 is possible while being socially just and economically prosperous,** and includes replacing fossil fuels with renewable energies, reducing energy demand, adapting transport systems and changing land use to produce more plant based diets, and naturally carbon-sequestering landscapes.[17]

15. **Effective climate change responses can be a way to build a richer, more resilient, fundamentally more vibrant world.** Access to low-carbon energy can improve health and livelihoods, while also protecting the climate.[18]

We call on our leaders to make the courageous decisions needed to create a fair, sufficient and effective international climate change agreement. The goal is achievable but priorities will need to change: currently, the majority of States commit more resources to warfare than to tackling climate change.

The choices we make now, personal and collective, can ensure that the poorest and most vulnerable peoples now, and all our future generations, do not suffer profoundly as a consequence of our actions. Our faith in common humanity gives us hope: love, rather than fear, can lead us through this crisis.[19]

This is a call to conscience.

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[13] Ibid. p.4.
[14] *The Nine Planetary Boundaries:* http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries.html
[15] Climate Change 2014, The Synthesis Report, p.15 http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf
[16] Ibid. p 20
[17] For example, as outlined in *Whose Getting Ready for Zero?,* Centre for Alternative Technology and Track 0, http://zerocarbonbritain.org/images/pdfs/wgrz-full-report.pdf
[18] Katharine Mach, Director of Science, IPCC Working II Technical Support Unit.
[19] Britain Yearly Meeting, June 2009, http://old.quaker.org.uk/quaker-response-crisis-climate-change and the Quaker Statement on Climate Change, 2014

Advance paper 20

The effectiveness of the IPCC communication: a survey of (mainly) UK-based users*

James Painter – September 2015

* This report forms part of the Joint Programming Initiative (JPI) AR5 in Europe project, which analyses how the IPCC's Fifth Assessment Report informs policymaking with the aim to improve the knowledge exchange between the IPCC and decision-making in areas such as adaptation, mitigation, and sustainable development. It includes several European countries, with a particular focus on Norway, Poland, Spain and the UK. The full report of the JPI project will be available in 2016.

Table of Contents

Executive summary including recommendations

The IPCC's Assessment Reports (ARs) are widely regarded as the most important and authoritative publications on a global scale which summarise the state of knowledge about climate science, its real and potential impacts, and the possibilities of mitigation. As one of the interviewees for this study expressed it, they are 'the equivalent of the King James Bible on climate change'.

The AR5 was no exception to this rule. Its four components (the three Working Group reports and a Synthesis Report) were published between September 2013 and November 2014. They received considerable attention from the media and policy makers around the world.

However, questions have been frequently raised about the effectiveness of the IPCC's communication work by governments, outside organisations, academics and other interested parties. In 2012, the IPCC launched a new communication strategy. Three key elements of this were:

- The primary target audiences of the communications efforts of the IPCC are governments and policy-makers at all levels (including the UNFCCC).
- Broader audiences, such as the UN, IPCC observer organizations, the scientific community, the education sector, non-governmental organizations (NGOs), the business sector and the wider public, also have an interest in the work and assessments of the IPCC. While these are not primary audiences of the IPCC communications efforts, the IPCC should look for ways to ensure that information is available and accessible for these audiences.
- While the IPCC itself does not produce derivative products aimed at specific audiences, it may engage with organizations that take elements of IPCC assessments and communicate them in more audience-specific formats. However, such products must not be considered joint productions or in any way products of the IPCC.

This study focuses on how the primary target audience and four other sections of the IPCC's broader audience viewed the communication of the IPCC 2013/4 reports. These are government and policy makers; the business sector; NGOs; the (higher) education sector and the media (as representatives of the wider public).

In each of the five sectors semi-structured interviews were conducted with between 5 and 7 representatives, giving a total of 30 interviewees, the vast majority from the UK. The interviewees met most or all of the following criteria: a) they knew about the IPCC reports b) had direct experience of using them for their work, c) were involved in the general communication of climate science and d) had views on the IPCC reports and how they could be better communicated to their sector.

We chose to focus on three key broad areas of questioning – the usefulness of the IPCC reports, their language and clarity, and recommendations for the future. All interviewees were also asked for any 'big picture' thoughts on the IPCC communication efforts in general and, where possible, about the use of up-to-date digital technology and the use of specialists to make the reports more readable.

Results from the interviewees were supplemented by points publicly raised by governments to the IPCC to improve its communications, and in published critiques of the IPCC. A limited amount of other expert opinion was also sought.

Of the huge volume of views expressed, ten broad areas were highlighted for greater discussion, and recommendations attached to each of them:

1. **The readability of the SPMs**: The Summary for Policymakers (SPMs) are high quality science reports used for many different purposes from policy formation to awareness raising. The general view of the interviewees is that they are low quality communication tools, where the language and figures are difficult, complex and too scientific for policy makers. Much more attention needs to be paid to the clarity and accessibility of the language used for policy makers and other non-expert audiences. Scientific jargon, which can include words which mean different things to scientists compared to a general audience, needs to be taken out.

2. **Headline statements**: The WG1 team released a 2-page summary of headline statements at the same time as the SPM. This practice should be adopted for all high-level documents of the IPCC, including all WG reports and one-off special studies. The headline statements would also go a long way to meet the requirement from many interviewees for a 'summary of the summary', or in other words a two-page summary of the SPMs, released at the same time as the SPM. Scientific jargon needs to be taken out of the 2-page summary, as in point 1.

Any summary document does not have to follow the chapter structure of the overall WG reports, and headline statements are not needed from each chapter. Policy makers would benefit more from key messages and cross-cutting themes which draw on various chapters. The importance of what policy makers need to know should take preference of what is scientifically interesting.

3. **More user involvement in scoping reports**: the IPCC should consider seriously the UK government's recommendation for more user consultation to gain more insight into how the IPCC might better tailor its products to user needs. Policy makers and other sectors like businesses could have more input into the scoping of the reports to help ensure that policy concerns are flagged more clearly in the final reports, and that IPCC reports would better inform decision making. This would fit with a general approach to communications that is more interactive and engaging rather than top-down.

Within this context, there is a general recognition that more targeted reports are needed for certain regions of the world such as South Asia or Africa. Perhaps as a trial with a regional report, the IPCC could conduct a process by which it engages with its report end users from the outset to help co-design the structure and language used throughout the report development.

4. **Derivative Products**: These have proved very successful. More derivative products should be targeted at specific and different sectors, such as cities. They need not have the official endorsement of the IPCC, but it could be highlighted that individual IPCC authors contributed to the reports. The challenge is to adapt the IPCC process to allow more deployment of IPCC authors to work with reports and summaries for targeted sectors, perhaps instead of devoting so much effort to mammoth-size WG reports. The IPCC should provide some accreditation and recognition to authors and universities for participating in this manner, in the same way as it does for the WG reports.

5. **The importance of outreach work**: Linked to points 3) and 4) above is the importance of outreach work and events (i.e. presenting the report in different countries to various audiences). These allow the authors to present and discuss the reports in their own words. There are still challenges in ensuring authors present the information in an audience-friendly way. But feedback suggests it can be a highly effective way of communicating the IPCC science when authors draw on their own expertise and scientific rigour to communicate the findings clearly to local or sector-specific audiences. However, outreach is expensive in terms of labour and money, both organizing the events and funding authors and other participants. More resources directed to this area of work would be helpful.

6. **The use of specialist writers**: There are advantages and risks in bringing in specialist writers. However, the overwhelming weight of opinion from the interviewees is that a) specialist writers/communicators should be introduced early as part of the writing and reviewing process; b) the right people exist who know and respect the primacy of the science; c) the right procedures and safeguards can be put in place to ensure the appropriate clarity of roles for such writers; and d) that the scientists and governments have the final sign-off. Several interviewees also stressed that employing public relations companies was not a recommended path.

7. **Metrics to assess the effectiveness of the IPCC work**: Much more can be done to set up more sophisticated metrics to assess the effectiveness of the IPCC reports, including communication. These could a) include more sophisticated media measurements, b) track the formal uptake by governments of the reports, c) assess with more rigour and robust criteria its impact on key policy making fora both nationally and internationally, and d) select key groups of policy makers or other target audiences to test and monitor the effectiveness of its communication in a more systematic way. If the IPCC is unable to do this itself, an outside organisation should be contracted to do it with clear guidelines from the IPCC.

8. **The use of digital technology, new media, and graphics**: The world in which communication now takes place is changing at a rapid pace. For younger generations in particular, traditional media platforms like newspapers and television are being replaced by digital and social media. The IPCC needs a digital communication strategy. Good

graphics are also essential to the effective communication of the information found in the SPMs and WG reports. However, at the moment many of them are too cluttered with too much information. Graphic designers and data visualisation experts, who have some background in, or knowledge, of the basics of climate science, should be brought in early into the writing and review process.

9. **Learning from other reports**: There are now a large number of reports on climate science and its relevance to policymakers which are published every year. Some, like the 2014 US Climate Assessment Report, have been widely praised for the way they were communicated. Others, like the Risky Business Report, have reached a target audience successfully. Despite the different contexts in which these reports are published, much can be learnt from exchanging and pooling good practice. The IPCC communications team needs to draw more heavily and in a systematic way on the experiences gained from the dissemination of other reports. The online presentation of the SYR modelled on the US Climate Assessment Report is a good start.

There is also a strong argument for ensuring that the IPCC draws the appropriate lessons from the previous assessment cycle, which some observers have seen as the IPCC's 'missing (learning) loop'. It is important to draw lessons from the whole process of how other reports are produced, and not just how they are communicated through the end product (the WG and Synthesis reports).

10. **Budgets and resources**: The IPCC has a budget of several hundred thousand pounds for its communication work, which has not always been spent. It may not be the best use of IPCC funds to substantially increase its permanent media staff as demands on them peak mostly at the time of publications. However, a strong case can be made for increasing selected funding for staff members dedicated to outreach work; another is building an online and social media strategy. More resources are also desirable for graphics development, pooling good practice, and developing better metrics.

Acknowledgements

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The AR5 in Europe project analyses how the IPCC's Fifth Assessment Report informs policymaking with the aim to improve the knowledge exchange between the IPCC and decision-making in areas such as adaptation, mitigation, and sustainable development.

Those involved in the project are the institutions CICERO and DNV GL, and participants from Oxford University, the Polish Academy of Sciences/Kundzewicz Management, Radboud University, Universidad Autónoma de Barcelona, University of Bergen, University of Edinburgh and University of Oslo.

Members of the project have given much useful input and comments both in their presentation and papers as part of the project, and on this paper.

The European Climate Foundation is the other funder of this report, and of other derivative products arising from the report.

An enormous debt of gratitude should go to all the interviewees from different target audiences who gave of their time freely and checked the accuracy of their quotes.

Jonathan Lynn, the head of communications and media relations at the IPCC, has been immensely helpful with his thoughtful insights.

Candice Howarth, a Senior Research Fellow at the Global Sustainability Institute at Anglia Ruskin University, Cambridge carried out the research and interviews with local policy makers, and wrote them up into chapter 4.1 (case study 1). She also provided other helpful inputs.

Susan Hassol from Climate Communication drew on her 25 years of experience as a science writer and communicator to offer huge inputs of wisdom. Many of her insights have been incorporated into the recommendations.

Other interviewees such as Michael Williams, Chief of Communications and Public Affairs at the World Meteorological Organisation (WMO), and Richard Black, former BBC environment correspondent, provided helpful context.

All errors of fact and judgement are the author's.

1. Introduction

The publication of the Fifth Assessment Reports (AR5) by the Intergovernmental Panel on Climate Change (IPCC) starting in September 2013 offers a unique opportunity to assess the effectiveness of the IPCC's communication strategy and its implementation. The Assessment Reports have been published every five or six years since 1988, and are widely regarded as the most important and authoritative publications on a global scale which summarise the state of knowledge about climate science, its real and potential impacts, and the possibilities of mitigation. As one of the interviewees for this study expressed it, they are 'the equivalent of the King James Bible on climate change'.

They are the culmination of work by several hundred climate scientists around the world. They consist of three working group (WG) reports, consisting of WG1, *The Physical Science Basis* (published on 27 Sept. 2013); WG2, *Impacts, Adaptation and Vulnerabil*ty (31 Mar. 2014); and WG3, *Mitigation of Climate Change* (13 Apr. 2014). A *Synthesis Report* (SYR) was released on 2 November 2014.

The IPCC publishes and highlights the extraordinary efforts of the scientists involved in assembling these reports. So for example, the WG2 reports involved 308 scientists from 70 countries around the world, and more than 50,000 comments on the text. WG1 and WG3 boast similar numbers, and in the case of WG1, the authors 'reviewed more than 9,200 scientific publications and 2-million gigabytes of data from climate models'.

These sorts of figures are very impressive and help to establish the robustness and credibility of the science, and the international intellectual effort behind the consensus view. However, what the IPPC does not parade with the same rigour is the number of professional staff employed by the IPCC on communicating their results – one head of communications and media relations, supported by one or two colleagues.

Starting in late 2009, a considerable amount of adverse publicity about the behaviour of a small number of climate scientists (in what the media dubbed 'Climategate') and the media attention to a small number of errors in the AR4 reports prompted the IPCC to commission a report by the InterAcademy Council (IAC) of its reviews and processes.[1] In October 2010, the IAC published its results which included a recommendation that the IPCC 'should complete and implement a communications strategy that emphasizes transparency, rapid and thoughtful responses, and relevance to stakeholders, and that includes guidelines about who can speak on behalf of IPCC and how to represent the organization appropriately'.[2]

The recommendation stemmed in part from a recognition that the IPCC had 'come under severe criticism for the manner in which it has communicated with the media and public. The lack of an ongoing media-relations capacity and comprehensive communications strategy has unnecessarily placed the IPCC's reputation at risk and contributed to a decline in public trust of climate science.' [3]

A review of the IPCC communications efforts led to a new strategy made public in June 2012. The key points about audiences were the following: [4]

- The primary target audiences of the communications efforts of the IPCC are governments and policy-makers at all levels (including the UNFCCC).
- Broader audiences, such as the UN, IPCC observer organizations, the scientific community, the education sector, non-governmental organizations (NGOs), the business sector and the wider public, also have an interest in the work and assessments of the IPCC. While these are not primary audiences of the IPCC communications efforts, the IPCC should look for ways to ensure that information is available and accessible for these audiences. <emphasis added>
- While the IPCC itself does not produce derivative products aimed at specific audiences, it may engage with organizations that take elements of IPCC assessments and communicate them in more audience-specific formats. However, such products must not be considered joint productions or in any way products of the IPCC.

[1] Painter, J. (2014). *Disaster Averted? Television Coverage of the 2013/14 IPCC's Climate Change Reports.* Oxford, England: RISJ.

[2] InterAcademy Council, *Review of the IPCC*, Aug. 2010, p. xv.

[3] ibid, p. 62.

[4] https://www.ipcc.ch/meetings/session35/IAC_CommunicationStrategy.pdf

- IPCC audiences are truly global in extent and are therefore very diverse. In its communications and outreach activities, the IPCC will take the specific context of different countries into account, which may require tailor-made outreach activities. For instance, this reflects an understanding that the communications needs of developing countries may be different to those of developed countries.

This study focuses on how the primary and the broader audiences viewed the communication of the IPCC 2013/4 reports. It chose one primary sector and four other sectors:

1. Government and policy makers
2. The business sector
3. NGOs
4. The (higher) education sector
5. The media (as representatives of the wider public)

We are aware that the category of 'government and policy makers' includes a wide range of types of policy makers from negotiators within the UN process, politicians, civil servants, local decision makers and planners, to representatives of bilateral and multilateral agencies. We focused on three case studies – local policy makers in East Anglia, UK; a broad range of policy makers in developing countries reached by the work of the network organisation, CDKN; and the experience of a FCO adviser to the government in the UK. We did not interview more government representatives as their official views are recorded at length in the submissions to the IPCC review process and the meeting held in Nairobi in February 2015.[5] Likewise, we did not interview representatives of the scientific community as they are the most likely to understand and speak the language of the IPCC reports.

In each of the five sectors we carried out semi-structured interviews with between 5 and 7 representatives, giving a total of 30 interviewees, the vast majority from the UK. A list can be found at the end of each section of chapter 4. The format was a mixture of face-to-face and telephone interviews.

It is of course of supreme importance how the interviewees were chosen in order to gauge the extent to which their views were representative of the wider sector. In each of the sections of chapter 4, we lay out why they were chosen, but in general we opted for interviewees who met most or all of the following criteria: a) knew about the IPCC reports b) had direct experience of using them for their work, c) were involved in the general communication of climate science and d) had views on the IPCC reports and how they could be better communicated to their sector. It is important to stress that although they represent a wide variety of views and experiences, most were very appreciative of, and sympathetic to, the IPCC and its work.

We also chose to focus on three key areas of questioning – the usefulness of the reports, their language and clarity, and recommendations for the future:

1. Usefulness

- To what extent did you use the 2013/4 IPCC reports to inform your work?
- Which of the IPCC 'products' were the most useful and relevant for your work (press release, SPM, FAQs, website, press conference, factsheets, or other products)?
- If you produced your own material based on the IPCC reports, in what ways did you rely on the IPCC material, and how much did you have to change it?

2. Language and clarity

- Would you say that there was a clear dominant message or narrative from the IPCC reports?
- How highly did you rate the clarity of the key findings?
- How would you rate the language used in SPMs and other IPCC products for simplicity, clarity and accessibility?

[5] Available via http://www.ipcc.ch/apps/eventmanager/documents/27/030220150347-p41_inf01_gov_comments_ref_options_paper.pdf

3. Recommendations

- In general, what two or three recommendations would you make to improve the communication of the IPCC reports in the future?

All interviewees were also asked for any 'big picture' thoughts on the IPCC communication efforts in general. In addition, where possible, they were asked about the two key recommendations to emerge from the Nairobi meeting on 'making the reports more user-friendly'.[6] These were:

- Ensure that up-to-date digital technology is used to share and disseminate information;
- Seek advice from various specialists to make IPCC reports more readable.

This last recommendation has prompted considerable discussion about how and when specialists should be introduced into the IPCC writing and review process, and what sort of specialists they should be.

It is also worth stressing that as we concentrated on the process and methods of communicating the reports, we did not dedicate a lot of time asking for a critique of the content of the scientific reports, although some interviewees were keen to express an opinion on this issue too.

Before giving a summary of the results of the interviews broken down by sector in chapter 4, we briefly review in chapter 2 some of the literature about the ways of assessing the effectiveness of communication. Here it is of particular importance to note that the IPCC does not at the moment have the resources to apply in a sustained and rigorous fashion the metrics often used in other sectors to evaluate their communication efforts. At the time of writing, a limited monitoring of media coverage is the only metric it has. In chapter 3, we summarise what the IPCC produced around the three WG and Synthesis Reports, what other research has concluded about IPCC communication, and the view from Jonathan Lynn, the IPCC head of communications and media relations.

Chapter 5 pulls together some of the main points found in the interviews in Chapter 4 and places them in the wider context of the existing literature and debates about the IPCC communication challenge.

Inevitably, this report is to a certain extent a snapshot of views mostly from the UK, but a snapshot nevertheless that is robust in the scope and focus of the interviews. In essence, it is designed to raise a series of important discussion points that should be interrogated and discussed further in support of the efforts by the IPCC to improve its communication work in the future.

[6] IPCC press release, 'IPCC takes decisions on future work', 27 Feb 2015.

2. How to assess effectiveness in climate change communication

An extensive body of academic articles and practice-based literature now exists on the general area of the effectiveness of climate change communication (Whitmarsh, O'Neill & Lorenzoni, 2011; Moser, 2010), and more specific areas such as the effective communication of the uncertainties around climate science. (Patt and Weber 2014) A 2014 special commission set up by the University College of London (UCL) and formed of scientists from different disciplines to examine climate change communication recommended the establishment of a new professional body in part to adapt the way in which scientists communicate with the general public and policy makers. Amongst its policy recommendations was that 'climate scientists should discard the "linear model" of "truth speaks to power" and participate actively in the "co-production" of policy formulations and decision-making'. (Rapley *et al.*, 2014)

There is also a growing recognition from top politicians and their advisors that scientists need to think just as much about how to communicate their science as about the science itself. For example, Sir Mark Walport, the current UK government's chief government adviser, has gone on the record several times stressing that 'the science is not finished until it is communicated'. (Hickman, 2015)

An overview paper by one of the world's leading experts on climate communication, Susanne Moser, included a helpful checklist of the basic questions that have to be addressed for a full understanding of the challenges and opportunities for effective communication: (Moser 2010, p. 37)

- the aim or scope of the communication – information giving, awareness and concern raising, or response prompting (engagement and/or behaviour change);
- the target audience (policymakers, general public, special interest groups and so on);
- the framing of the issue (including language);
- the key messages, including how the information conveyed can be made most useful and accessible;
- the messengers (IPCC authors, other scientists, NGOs, the media etc.);
- the modes and channels of communication (written, verbal, non-verbal).

Moser stresses the importance of recognizing the interdependence of these various elements in order to be effective, and that all of these elements are affected by contextual factors that influence climate change communication. These include non-climate issues which compete for attention, create barriers to public engagement or make it easier for people to act on the information they receive. One key contextual factor is the media, which is undergoing rapid changes in many countries including the digital disruption from online and social media and the loss (in some countries) of specialist science and environment reporters.

Moser is not the only expert to draw on academic literature to help communicators around climate change. Brigitte Nerlich *et al*. (2010) draw on the pioneering work by Professor Brian Wynne to stress the importance of going beyond communication strategies which imply it is generally the public which needs to be informed by experts, which 'in itself is not a good perspective from which to begin dialogue. There is often a wish to transmit, educate and inform the public rather than an opportunity to transform decisions and commitments on both sides'. (p.106)

She and other scholars have stressed the importance of the cultural values of audiences as being a powerful shaper of audience responses. A helpful overview of the interdisciplinary research which highlights the powerful role that human values play in shaping individuals' engagement with environmental issues can be found in a recent paper by Adam Corner and colleagues. (Corner, Markowitz & Pidgeon, 2014) The paper reviews academic and 'gray' literature from civil society organisations which explores the role of human values (and the closely related concept of cultural worldviews) in public engagement with climate change and how public messages about climate change should be framed.

Finally, Susan Hassol has drawn on her rich experience as a senior science writer and communication expert on all three US National Climate Assessments, the Arctic Climate Impact Assessment, and the FAQs for IPCC AR4 WG1 to offer some key points about communicating major science reports. In a talk at the American Geophysical Union (AGU) fall

2014 meeting, Hassol focused on her experience of the 2014 US Climate Assessment Report, which in effect summarised her views on best practice for effective communication: [7]

- Communication should be integrated from the outset, and not added at the end; in other words, it should be an integrated iterative process based on a series of conversations, and not sequential (where the scientists hand over the science report to communicators once it is finished).
- Language issues – take out all jargon, and also take out words that mean different things to a general audience such as 'enhanced', which to a scientist means 'increased' (as in 'enhanced greenhouse effect') but to the general public means 'improved'.
- Summarise and synthesise long reports, and include cross-cutting findings that come from different parts of the report. A highlights document should include 'traceability' (where the statements come from in the long report).
- Make sure there are very clear graphics, which are 'as simple as possible but no simpler', and broadcast-ready graphics.
- A first-class web development team is essential, who know how to promote the 'shareability' of parts of the report on social networks.
- Carry out media training for the main authors focusing on simple, clear, main take-home messages with the big overarching themes ('it's happening now', 'it's affecting Americans', and 'we can do something about it').
- End with hope (there are things we can do to tackle this problem).

This body of research is relevant to any evaluation of the effectiveness of the IPCC communication work. Starting with a good understanding of the information needs of its different target audiences is clearly paramount, as is the language used, the key messages and the modes of communication.

The need for systematic testing of the usefulness of the products is also of supreme importance. Moser has argued that common metrics such as printed pamphlets delivered, media hits, or website surveys are helpful but not sufficient. Opinion surveys before and after events such as Al Gore's film *An Inconvenient Truth* can also be helpful in measuring any changes in public attitudes. But these metrics fall short of a careful examination of effective communication. To measure this more robustly, close monitoring of the responsiveness to the changing needs of different target audiences is necessary. Constant testing, monitoring, updating and evaluation with the target audience are the best methods.

As mentioned in the Introduction, the only metric that the IPCC comms team currently uses is one that measures mentions of the IPCC in the media, where they divide the articles into three categories: 'good' (meaning broadly in favour of the IPCC), 'bad' or 'neutral' (according to the language used). According to one leading IPCC author who receives a daily summary of news articles, the articles chosen are 'very eclectic and unbalanced' and the categories 'unusually crude'.

There may be lessons that could be learnt from the work of non-profit organisations like the investigative journalism organisation, ProPublica, which has won two Pulitzer prizes. Because of the pressure from major funders to measure the impact of their investment, the organisation has invested considerable intellectual effort into conceptualising and assessing impact. (Tofel, no date) It now makes use of multiple internal and external reports in charting the possible impact of its journalism. One of these is called the Tracking Report which records not only each story published, but also the instances of official actions influenced by each story (such as statements by public officials or agencies or the announcement of some sort of policy reviews), opportunities for change (such as legislative hearings, an administrative study or the appointment of a commission) and the change that has resulted. These tracker reports last over periods of several months, and in some cases years. Each ProPublica board meeting contains an Impact Report based mainly on the Tracking Reports since the last meeting.

Admittedly, it is easier for a journalism organisation to monitor its impact by such metrics, but the IPCC could a) make use of much more sophisticated media measurements, b) track the formal uptake by governments of the reports, c) assess with more rigour and robust criteria its impact on key policy making fora both nationally and internationally, and d) select key groups of policy makers or other target audiences to test and monitor the effectiveness of its communication in a more systematic way.

3. An overview of the IPCC communication work

[7] https://virtualoptions.agu.org/media/ED22A-03.+Climate+LiteracyA+Effective+Responses+and+Solutions+through+Best+Practices+in+Communication,+Partnerships,+and+Networks+II,+Presented+By+Susan+Hassol/0_14hg4ikl

3.1 Context

As already mentioned in the Introduction, the IPCC re-examined its whole communication strategy starting in 2010 partly as a result of a perceived reputation loss from a slow communication response to criticisms or questioning of its work and some of its findings. Building on the recommendations of the InterAcademy Council in August 2010, the IPCC published a comprehensive Communications Strategy in 2012. In addition to identifying its primary and secondary audiences listed earlier, the strategy mentioned two key communication goals: (Hickman, 2015)

- To communicate its assessment findings and methodologies, by providing clear and balanced information on climate change, including scientific uncertainties, without compromising accuracy;
- To explain the way the IPCC works, select its authors and reviewers, and produces its reports and other products. This will promote the understanding of the reports and underpin its reputation as a credible, transparent, balanced and authoritative scientific body.

A new head of communications and media relations, Jonathan Lynn, a former Reuters journalist of 32 years' experience, was appointed in November 2011. He was able to call on the support of one or two colleagues, whose status was sometimes voluntary, sometimes paid. As described in section 4.3, his appointment led to considerable improvement in the professionalization of the IPCC communications operation, particularly in the areas of responding quickly to questions from members of the traditional media. In some cases, members of the Technical Support Units, which exist mainly to support for the work of the WGs, also provide support on the communication of the reports, although this varied between the different practices of the co-chairs of each WG report.

It was decided not to beef up the number of staff members of the IPCC comms team around the time of the release of the WG and Synthesis reports, when there would be a significant rise in media and other interest. Instead, the comms team agreed to external help from a variety of other organisations to help in the media work, working under a Memorandum of Understanding with the UN Foundation, who provided a total of about eight additional people. Lynn himself is of the view that this 'model' worked successfully for the media coverage, and could work for the future. (See section 3.4 and conclusions below)

According to IPCC figures[8], the IPCC had a total budget of about £850,000 allocated to 'communication activities' in 2014, of which just over half (£430,000) was spent, leaving £420,000 in the bank. However, according to IPCC sources, the budget was overspent on outreach activities in 2015.

In addition, the UN Foundation worked with the public relations company Havas (backed by a large donation from the Villum Foundation in Denmark) to carry out media training for IPCC authors and other activities. The IPCC also did its own training with the support of the company, Escott Hunt.

IPCC authors are also involved in an extensive series of outreach activities to communicate the IPCC findings to governments, the media, the business community and NGOs. Notable amongst these activities are the structured policy dialogues with negotiators and interested parties within the UNFCCC process, which often take place at the COP and sub-COP meetings. Full details of the IPCC outreach work can be found on its website.[9]

3.2 Main products

The Summary for Policymakers, or SPM, is the main way the IPCC has summarised and communicated its conclusions. This is arrived at by a team from each WG reducing their full report down to a summary document, which is then further refined by and 'unanimously accepted' by government representatives from around the world. In other words, the SPMs are the result of a political negotiation. In addition, a Synthesis (SYR) report brings together the findings of each WG report into one publication. As we shall see in section 4.3 and 4.4, the world's media and other organisations like NGOs mostly work from the SPMs to report on the IPCC's findings and then disseminate them to a wide variety of audiences.

These SPMs are still long by the standards of most summaries of reports. All of them contained more than 30 pages. In the case of WG1, the important pieces of information were highlighted in brown boxes and bold text. Also, the highlighted boxes were drawn together into a 2-page document of 19 headline statements. The WG1 team, including the Technical

[8] http://www.ipcc.ch/apps/eventmanager/documents/27/050220151113-p41_doc11_trust_fund_programme_and_budget.pdf

[9] http://www.ipcc.ch/news_and_events/news_and_events.shtml

Support Unit, developed and wrote them at the same time as it developed the SPM. The result was they emerged organically from the text and there was little controversy around them in the approval process. Because of the success of the WGI headline statements, governments encouraged WG2 and WG3 to develop them too. But because they were added late in the process rather than emerging naturally from the SPM it was clear that they would give rise to lengthy discussion and they were dropped in the approval plenary. On the other hand they were produced successfully for the Synthesis Report.

The SPMs normally follow the underlying chapter structure of the full reports (the exception is WGII). There is a tacit acknowledgement that they are not a full account of the science, as a Technical Summary is also provided. At the time of the launches, the full chapters of the WG reports on which the SPMs are based were not normally available. (WGI and III released the full report a couple of days after the SPM in the form of its final draft, with disclaimers saying it would be changed for layout and copyediting. WGII released it on the same day as the SPM.)

A press release was also provided on the day of the launches. Details of the launch dates and locations, plus details of the main messages found in the press releases and the SPMs, can be found in Painter 2014 (pp. 19-26). The AR5 was the first time the IPCC issued its own press release for an assessment report - it had been handled by UNEP/WMO for AR4. (However, the IPCC did issue its own press releases in this cycle for the two special reports SRREN and SREX).

Journalists who did not attend the actual press launch could follow the proceedings via a live webcast (later posted on the IPCC website), and some questions were taken to the panel of IPCC authors and others via this method. Dozens of interviews were also arranged with IPCC authors before and around the times of the launches, particularly for WG2. In some countries, such as Norway, the USA, and the UK, local meetings were organised by research centres, NGOs, or science media centres at which climate scientists were on hand to answer questions from journalists.

Professional science writers worked on a set of Frequently Asked Questions for WG1 and WG2. These were included when the Technical Summary volume was published, between the SPM and the chapters.

Videos and other material were made available on the IPCC website. Minor attempts were made to use new and social media to disseminate the reports. An IPCC Youtube channel and various social media accounts were set up. Some tweets using the IPCC hashtag were also sent out, although these were limited in number.

The IPCC 2012 communication strategy recommended the use of 'derivative products' aimed at specific audiences. The essential idea is that the IPCC can work with organisations that take parts of the WG reports and communicate them in formats that work for those audiences. However, the IPCC is at pains to stress that these products are not the work of the IPCC or to be considered joint productions. Nor can they officially endorse these products. Notable examples of the derivative products were i) those produced by the Cambridge Institute for Sustainability Leadership (CISL) under the *Climate Change: Implications for Business* project, which were aimed at eleven business sectors in the UK. These are discussed at length in section 4.2; ii) the reports produced by the Climate Development and Knowledge Network (CDKN) for four different regions or sets of developing countries, where IPCC authors had a major role in guiding the reports but where the IPCC imprimatur was absent. These are discussed in section 4.1.2; and iii) the reports produced by Climate Nexus, which are mentioned in section 4.4.

3.3 The view from the IPCC Secretariat

In an interview for this research, Jonathan Lynn gave valuable context and insight both into the work of the IPCC and the challenges for the future. He himself focuses mainly on media work, but stresses the importance of helping the processes by which the IPCC can reach key target groups in a more effective way. His observations and suggestions provide essential context for the discussion and points that emerge from the chapters that follow. His ten key points were the following:

1. The 'model' of a small core team of IPCC staffers (himself and one or two others) working with about eight people from outside organisations 'worked well' for the media coverage of AR5 and in his view, is the way forward.

2. In general he was happy with amount and tenor of media coverage, although he recognises the difference in the amount of coverage in the media in different countries. India is a particular challenge.

3. There is a general acceptance that the material the IPCC produces is not always suitable enough for key sectors. So derivative products are very important – CISL and CDKN reports and one by Plan International for kids are good examples, in his view. There is a strong need to find a way of getting more IPCC author involvement, even though the IPCC cannot formally endorse them.

4. The absence of sufficient regionally-focused material is a problem, but not much can be done about it in the absence of more research on some geographic regions (such as Africa).

5. Outreach work and events (i.e. presenting the report in different countries to various audiences) are extremely valuable because they allow the authors to present and discuss the science in their own words. There are still challenges in asking authors to use comprehensible slides and not to talk in jargon, but when it works it's a highly effective way of communicating the science by people who know exactly what they are talking about and don't stray from the scientific rigour. However, outreach is very expensive in terms of labour and money, both organizing the events and funding authors and sometimes other participants.

6. The absence of proper metrics to measure the effectiveness of communication efforts is recognised. There is a strong need for other metrics, particularly with policy makers.

7. When and how to bring in specialist writers is difficult, as is the question of what sort of specialist writers. But whoever it is, science writers and/or graphic designers, they should be involved from the start. If such people can be built into the teams early on, so that the scientists are working with them, and see them as equals from the start, then it could be done – even for the SPMs. What does not work is bringing someone in at the end of the process.

One idea is that someone both with a solid background in science and with good science writing skills forms part of the chapter teams. He or she could be one of the authors but also have an overview of the way the text is being written and expressed. (There is a precedent for this as someone from the TSU was working with WG3 authors). The process could be analogous to the way WG1 authors worked with headline statements early on - these went smoothly into the SPMs.

8. Many IPCC graphics have too much information in them, and are too complicated for a generalist audience. Some of the WG1 slides did work for policy makers, though. Better graphics are one of the best ways for making the reports more accessible.

9. The videos produced by the IPCC were seen as 'a great success' as the scientists got involved and helped to produce something scientifically robust.

10. Social media: more could be done at the time of the release of the reports, but it is not realistic to run a 24/7 social media operation as the IPCC only produces irregular reports. Besides the methodology reports by the Task Force on National Greenhouse Gas Inventories (TFI), there have been six over the last six years (the four components of the AR5 and two special reports).

Jonathan Lynn also highlighted some key challenges for the future:

- There is strong resistance from some IPCC authors and chairs to communication specialists as they fear that they will distort the science or have too much influence. (For example, Jonathan himself is not normally allowed into the lead authors' meeting, but he was present in the discussion of the Synthesis report.)
- IPCC communication efforts are hampered in some way by the complicated UN procurement process – it is easier to work with outside organisations bringing their own funding and people.
- The time between the agreement on a final text and the press release always get squeezed so there is not enough time to rehearse and think over key messages.
- There is a need to get more IPCC authors involved with derivative products. The challenge is to build into the IPCC process more time for them to help with this and other outreach work.
- There is also a need for more media training for some of the authors, including how to simplify their presentations into understandable graphics. Two sorts of presentation would be one way forward – one for scientists and a lighter one for policy makers or non-specialists.
- A different approach to communications is taken by the three WG teams and leaders; there was not enough coordination between them to do things in similar ways, so this needs to improve.
- Much of the reports are written and produced too much by scientists for other scientists.
- There is a need to assess and improve the user-friendliness of the IPCC website for different sectors. At the time of writing, the Synthesis Report website was still a work in process.
- The 2014 US Climate Assessment was a good model for graphics – the IPCC used the same graphics designer for the *Synthesis Report*.

3.4 Critique of the IPCC communication work

Several of the points made by Jonathan Lynn are relevant for an appraisal of some of the criticisms that have come the IPCC's way in recent weeks, and cover many of the same areas touched upon by several of the interviewees in chapter 4. The key issues will be taken up again in the conclusions, but at this point it is worth briefly summarising some of the critiques written and published recently by observers of the IPCC communication work as they provide some of the context for comments by the interviewees.

A special edition of the academic journal, *Nature Climate Change*, in April 2015 included several critiques of the work of the IPCC and the communication of its reports. (NCC, April 2015) A commentary piece by the former BBC environment correspondent, Richard Black, asserted that the SPMs were ill-suited both for policy makers and the wider public, mainly because of the jargon-filled language used and the failure to distil the main conclusions into a two-page briefing 'of the type that world leaders are used to receiving from their aides'.(Black, 2015) Black included a series of summaries of simplicity and clarity (in his view) which would better serve the policy-making community. Black finished by making three recommendations about how to change the way each WG worked, one of which was that each WG should abandon the idea that the SPM must acknowledge every underlying chapter. This point will be taken up in the Conclusions.

In the same edition of *Nature Climate Change*, Leo Hickman, also a former journalist (at the Guardian) and now at Carbon Brief, made a powerful case for the IPCC to take more account of the way online and social media have revolutionised the way information is now communicated. (Hickman, 2015) He argued that although the IPCC had operated Twitter and Facebook accounts for several years, neither provided 'much in the way of reactive interaction with its audiences.' He also quotes three examples of good practice by climate scientists.[10] His three main recommendations, which would all involve considerable time and energy on the part of IPCC authors, are reproduced in section 4.4.

Saffron O'Neill and her colleagues at Exeter University concentrated on assessing the ten dominant frames used by the media in the USA and the UK when reporting AR5. (O'Neill, 2015) However, the article included the conclusion that the different newsworthiness of the three WG reports could have been in part due to the sequential release of the reports (leading to 'climate fatigue' on the part of journalists by the time of WG3), and the availability of a translation of technical writing into media narratives, in the case of WG1, but not in the case of the other reports.

Several papers have focused on and criticised the language the IPCC has used to communicate uncertainty by using different ranges for certainty and confidence levels. (Budescu *et al.* 2009, 2014; Patt and Schrag, 2003) Of equal relevance to this study is a paper by Ralf Barkemeyer and colleagues, who carried out a linguistic analysis of the SPMs from 1990 to 2014 as well as related media coverage on the launch of IPCC assessment reports. (Barkemeyer *et al.*, 2014) The paper found that the SPMs clearly stand out for very low readability scores (where an equivalent to a PhD level of understanding of climate science is needed), which have remained relatively constant despite the IPCC's efforts to consolidate and readjust its communications policy. In contrast, clear changes over time and between countries can be identified in scientific and broadsheet newspaper coverage, with coverage on more recent reports generally becoming more readable and emotive.

A recent paper has also assessed how effectively the IPCC scientists addressed the issue of uncertainty when presenting the findings of the WG1 report at the press conference in Stockholm in September 2013. (Hollin and Pearce, 2015) The authors of the paper argue that the scientists fell into what they called the 'IPCC's certainty trap', and inconsistencies led to confusion within the press conference and subsequent condemnation in the media.

Several papers and presentations which have formed part of the EU's Joint Programming Initiative (JPI) on Climate (AR5 in Europe) project[11] have also directly or indirectly critiqued the IPCC communication work. For example, research

[10] Hawkins, E., Edwards, T. & McNeall, D. *Nature Clim. Change* **4**, 154–156 (2014); http://www.realclimate.org; http://www.skepticalscience.com; https://twitter.com/richardabetts.

[11] http://www.cicero.uio.no/webnews/index_e.aspx?id=12065

carried out in Spain and Holland which involved interviews with policy makers suggested a low influence of the IPCC reports on local policy processes but high credibility and legitimacy (Spain), and that the SPMs were 'a low quality communication tool', where the language and figures were difficult, complex and too scientific for policy makers (Holland).

A paper written by Steve Yearley and colleagues (Yearley *et al.*, 2014) for the same project showed that, contrary to what one would anticipate, little is known about the way the principal outputs from the IPCC process are taken up and used, even in countries – such as the UK and Norway – which are supportive of the IPCC's work.

In its abstract, the paper wrote that:

'The IPCC is committed to producing policy-relevant work, yet there are few studies or evaluations of how its work does inform or influence policy. We indicate also that this lack of attention to the practicalities of policy relevance extends to the IPCC itself, for there is little information on the extent to which IPCC documents' impact on policy is tracked. Nor is it clear how this information is fed forward into the process of review or the design of assessment cycles.'

On a related theme, two academics, David Viner and Candice Howarth, have criticised the IPCC for not including practitioner-based evidence, which they argue is 'fundamental to make the reports a relevant source of information for decision-making'. (Viner and Howarth, 2014) In the article, they recommend that the IPCC and other official assessment processes engage with practitioner communities by 'integrating them in the design, and writing, of assessments – in this way, the language, style and results can meet the needs of the end user'.

Finally, a report by the Oxford-based NGO COIN made seven recommendations for the IPCC in its communication with its secondary audiences, including 1) increasing the amount of resources for communication work and training of scientists, 2) embracing video content and social media, 3) showing the human face of the IPCC, 4) identifying a diverse range of partners, 5) telling human stories about climate change, 6) testing its output with different audiences, and 7) no more ARs, but rather starting with the needs of audiences, which would deliver science to order. (COIN 2014) Points 1) and 2) were considered 'easy', points 3) to 6) 'moderate' and point 7 'difficult'.

4. Interviews with key sectors

4.1 Governments and Policy Makers

Case Study 1 – Local Policy Makers in the East of England, UK

1. Main Points
2. Recommendations
3. The Importance of Local Policy Makers
4. More details on main points
5. Additional quotes
6. List of interviewees
7. References

1. Main points

- IPCC reports are considered by local authorities to be very authoritative and grounded in evidence, and therefore provide the most reliable source of evidence on climate change.
- The reports, and particularly Working Group I, are rated highly in terms of clarity, and provide a stamp of endorsement on the evidence on climate change which is significant for their audience.
- The reports are frequently used to provide background to local policy making, such as climate change or environmental strategies. However, they rarely directly inform decision-making as the reports do not provide a useful local analysis of impacts and responses to climate change at the local level.
- The reports are used for internal and external communication purposes for which summary documents such as the Synthesis Report (SYR) 2-page summary are particularly useful.
- In general the SYR and Working Group (WG) SPMs are used the most frequently. The press releases, quotes from the report launches and FAQs are used on occasion.
- Often internal briefing documents are created to align with the interests and audiences local authorities deal with. On occasion alternative resources such as those provided by UKCIP and other local councils are used.
- The principal limitations observed about the IPCC reports are the inaccessibility of the language to non-expert audiences and the lack of evidence showcasing new impacts or innovative solutions that are not already being used locally.

2. Recommendations

2-page summaries of reports

- **Content**: The IPCC reports are exceptionally valuable. However, more summary documents are needed, no more than 2 pages with information on specific impacts (e.g. temperature, rainfall, sea level rise) to enable quick and accessible information to inform decision making at short notice.
- **Language**: When it comes to practical decision making and looking at informing decision making in national and local government, the reports need to be more readable and accessible.
- **Targeted/audience specific**: Talking to policy makers at different levels about how useful they find the reports and what different people's needs are would be useful.
- **Clarity of credibility**: More clarity is needed on the credibility of the reports, with more information on the number of governments involved and the nature of the peer review process (in terms of papers written that are referenced in the report as well as the IPCC report writing process itself).
- **Context**: The general public is more concerned about what the likely impacts will be and what they need to do about it.
- **Length**: Interviewees praised the SYR summary and recommends the IPCC continue down this route. Shorter summaries with key statistics and facts would be very useful in writing the local council's climate change strategy as this would save a lot of time and resources.

Making it local

- **Local focus**: For Local Authorities, the reports need to be broken to specific messages each Local Authority could use to help inform decision making on local transformations to a low carbon economy. On occasion, the way in which the IPCC frames climate change as global means it can be dismissed at the local level.
- **Spokesperson/Champion**: Having someone or something that can communicate concisely the key messages of the reports would be 'incredibly useful'. It would be helpful to have a network of local champions, affiliated in some way to the IPCC, who demonstrate the relevance of the IPCC reports and global climate change to the local area.
- **Local policy relevance**: Any additional support on how the IPCC can help evidence-based policy making, particularly resources that are produced to help communicate the message, would be very helpful.
- **Intermediaries/translators**: The role of intermediary/translator organisations is very important in helping to communicate the key findings from the IPCC reports. Adopting a country-level approach would be useful to enable more use of the content of the reports, particularly looking at impacts and adaptation.

The role of digital technology

- **Regular updates**: Consistent updates on a regular basis, via social media, would enable faster access to up to date knowledge in the field and stimulate thinking on a day to day basis.
- **Target non expert audiences**: The use of digital means would be very helpful in making the reports more interactive for example through more infographics with more emphasis on clear graphs and data.
- **Increase navigation**: technology to help condense and break-up the reports and help navigate to specific themes in the reports.
- **Engagement with audiences**: the IPCC could consider setting up a series of webinars to communicate parts of the IPCC reports to different audiences following publication.

The role of communication specialists

- **Slight scepticism** about the use of communication specialists as it can be a massive challenge to ensure the scientific message is not lost in the process of translation.

3. The importance of local policy makers

The challenges which have arisen in the adoption and implementation of international and national plans of action to tackle climate change have led to an increase in locally-based initiatives often linked with and demonstrating co-benefits to environmental, economic and social policies (Bedsworth and Hanak, 2013). Responses to climate change in terms of both mitigation and adaptation occur at the local level and are needed to achieve national and EU 2030 Energy and climate targets. In addition, local decision and policy makers have a deep understanding of the impacts of climate change locally, including how local stakeholders, communities and structures respond and the role they play in driving solutions for effective low carbon transformations (Vogel and Henstra, 2015).

In considering how to design policy responses to climate adaptation, 'upscaling' through the use of local case study analysis is increasingly seen as a useful evidence-base to develop public policy solutions grounded in contextual research (Larsen *et al.*, 2012). Local policy makers are on the 'front line' of local implementation of climate change solutions and therefore contribute to developing locally-based nationally-impactful solutions to climate change (Argyriou *et al.*, 2012). They rely on certain types of data such as rainfall, temperature and sea level rise to inform decision-making on issues ranging from energy efficiency, economic development and community wellbeing and growth, making them important climate change information users and obvious audiences of the IPCC reports.

For this study, seven local policy representatives mostly from the East of England region in the UK which is vulnerable to numerous impacts of climate change including sea level rise, were interviewed to provide a representation of the different types of roles that exist at the local policy level: councillors, climate change officers, developers of local climate change and environment strategies and local government agencies. Interviewees were approached based on their role in shaping climate change policy and decision making as well as their knowledge and use of the IPCC reports in informing their decisions. Interviewees' experience and knowledge of climate change varied with some new to the issue and others having experience in engaging with academic and science literature to inform their decision making.

4. More details on main points

The use of IPCC reports: The IPCC reports are frequently used to provide background to local policy making, such as climate change or environmental strategies, and to assess alignment with national climate data (from UKCIP). The reports are considered by local authorities to be very authoritative and are perceived as a necessary and useful evidence base highlighting key data on sea level rise, temperature and rainfall.

However, as interviewees require data to inform their local decision making, the IPCC reports are not particularly useful in communicating the local impacts and dimension of climate change.

> *'As a partnership, obviously we keep abreast of latest developments in the science and the IPCC reports we recognise completely as being the most authoritative source of information on the latest scientific findings.' (LP1)*

> *'I think that the IPCC, for my audience, is very authoritative. It captures a lot of media attention, so from that point of view it's a very significant document. (…) It's more about the profile and the authority of the IPCC, which is significant for my audience.' (LP3)*

Internal and external communication: The IPCC reports are the most authoritative accounts of the science. Some councils distil the reports, particularly the SYR by creating short locally-relevant summaries of each WG report to give a local flavour and context of the reports, and disseminate these through local engagement activities with the public, business. They use the IPCC outputs for their own internal and external communication purposes and particularly value summary documents such as the SYR 2-page summary.

Translating climate change narrative to a local context: The key headline messages from the IPCC reports are often translated via the production of Briefing Notes on each of the WG reports as well as webinars on each of the reports (the latter proving very popular). Often communicating the IPCC reports is aimed at two audiences: internal senior managers and staff as well as external facing staff - for the Environment Agency for example, this is mainly through the 'Climate Ready' programme. For this, the IPCC reports are not the only resource used: a combination of IPCC reports as well as briefing materials provided by DECC are used to inform their Briefing Notes and framed more to a UK context. However, other resources provided by the IPCC for AR4 for example have been used historically (since publication, not necessarily around the launch), particularly the graphs and images. Interviewees predict a similar gradual usage over time.

However, the use of the IPCC reports is dependent on local policy priorities with one of the interviewees admitting to not consulting the IPCC AR5 reports to inform their decision making as their current council priority focus was very much on energy efficiency. However, the IPCC reports are recognised as grounded in evidence and therefore provide the most reliable source of evidence on climate change. In the past they have relied on the IPCC reports as an evidence base to develop the National Indicators on climate change adaptation and mitigation. They do consult the IPCC reports, and particularly the SPMs, in mapping the effects of climate change locally. In developing their own materials they are very conscious about not changing facts and figures from the original reports as they are aware how easily these can be misconstrued.

'Certainly it's very influential in terms of the international negotiating process. In terms of the impact and adaptation side of things it's less influential because the research already exists. Impact and adaptation is more local - we tend to know about the research because it's happened in the UK already. In a way that's putting a stamp of endorsement on it rather than stating new findings. That's it on the modelling side. I think it does influence future modelling, and on the impact and adaptation side it's much more about authority and making the case, and then awareness raising.' (LP3)

As a reference to develop environment and climate change strategies: The IPCC reports have been used as a reference (in the introduction) for the Environmental Strategy for Norwich City Council to provide a general picture about climate change. They would mainly use the WG or SPM reports as well as some of the quotes around the launch of the reports, but this is only as a generic high level account of climate change. In terms of evidence, they tend to draw on resources produced by other councils and national data, more than the IPCC. The IPCC reports are used to reinforce the importance of a measure/initiative the council is doing or to justify more investment.

When I was part of the ERDF funding programme from Europe, one of the objectives included climate change, and there was some opportunity to use the data from the report in the setting up of the programme. (…) It was maybe limited in terms of what it actually eventually provided. I used the IPCC stuff as a reference point (…). The projects that the programme might support needed to be justified in terms of what it would be delivering in its outcomes. Admittedly lots of the data was contextual setting but it was useful in that basis' (LP5)

'I looked at reports from the IPCC in drafting the [council's climate change] strategy back in 2012 but at a high level really to set out in summary what the evidence was around how climate was changing globally. What I essentially tried to do was translate that to a regional and local setting and therefore the things that the council needed to do. I suppose it informed the strategy at a fairly high level but there were a lot of other things that I drew on.' (LP6)

As a basis for decision making: The IPCC reports are used to inform decision making for some interviewees for example as an '*introduction in the City Council environment strategy*' (LP4), they are considered '*a prompt for conversations around the subject*' (LP1) and the main messages are '*distilled for the sort of types of audiences that we engage with*' (LP1). They are considered to be a valuable resource to '*reinforce the importance of a certain measure that the city council is doing, or something that we think they should be doing. For example, if we want to argue that they should put more money into the environmental strategy, that's maybe when something like the IPCC report would come up*' (LP4). They have been particularly useful in some cases when advocating for more action on the climate change agenda, particularly in context where one particular party may be trying to encourage another to demonstrate more leadership:

'Mainly arguing with the other parties, and trying to argue our case when it comes to what officers are writing in their reports. Then from there, officers take over, and they do the outward facing material. Unfortunately, especially as an opposition, you have very little input. We try to point towards scientific papers and ... How far they take that up, is really up to them. Our communication isn't much about the details. It's much more about actions that people can take.' (LP4)

However, interviewees emphasise the importance of targeting the content of the IPCC to specific audiences and that in the case of local policymakers, if the content of the IPCC report does not align with the needs of the audiences, then they will not be used or will need to be translated.

'My audience here is councillors, political leaders, and also directors and leaders of our sections, whose focus is upon clients-based financial savings and their own day-to-day business. It's always difficult to come across with something such as climate change and how that actually affects their day-to-day business.' (LP2)

'Over a longer period of time it has more influence on decision-making. For example, I work with the UKCIP on the UK projections, and do a lot about thinking how we incorporate those corporate international modelling efforts into the next set of projections. A lot of what we're doing is thinking about what is the worst case for sea level rise, and finding time to incorporate that brand of modelling output. I think the AR5 process as a whole, or thinking internationally about getting to the best science, is really important.' (LP3)

Limitations: For a minority of the interviewees, the language in the IPCC reports is perceived as inaccessible, heavy and dense and '*could be plainer*' (LP1) although the language in AR5 is an improvement on AR4. This is accepted as being a reflection of the evidence base covered and the different audiences of the report for the IPCC in comparison to local policy makers, who are more likely to engage with local businesses, community groups, stakeholders, internal staff on issues such as domestic energy efficiency, business services on offer etc. This suggests that many of those interviewed saw it as their role to translate the content to make it more accessible to internal staff who were unlikely to consult the reports themselves.

We didn't change any of the findings but perhaps the wording sometimes. I know that the wording is designed to be accessible. As accessible as possible within the context that it's released in but we still find that we sometimes have to put things in slightly plainer language without changing any of the essential messages clearly. We're not attempting to interpret it. We are presenting it as it is of course because of what it is, where it's come from but then sometimes, the language just needs to be softened a little bit.' (LP1)

An emerging observation from each of the interviewees is that, while it provides the baseline and highly influences the context within which local policy making may be shaped, it '*doesn't tell us anything we didn't already know that's required to make those sorts of decisions*' (LP7). The data and evidence (for example on temperature) are useful to inform local policies such as '*housing and how housing and retrofitting energy efficiency with housing would be critical in projects going forward*' (LP5), and so through its various products, provides an array of resources to refer to where needed.

'We know we've got to do a lot more in terms of carbon reduction. We know we've got to prepare for a changing climate in terms of water resources, flood protection, all those sorts of things, which are the bread and butter of what I do. It's useful background information to give us the encouragement that we're doing the right things in the right places, but it's so high level compared to what we're doing on a day-to-day basis in towns and villages in people's homes and farm land in Suffolk. It is background more than anything else.' (LP7)

Which IPCC products are used? The IPCC WG reports are used at a high level to set out the evidence of climate change globally, and then translated to the local level for the design of locally-focused strategies (particularly relevant to towns and households). The SPMs as well as the SYR are most commonly used with a little use of the IPCC websites and fact sheets (mainly on what the IPCC is). The summaries in particular are used for background and to give encouragement that they are doing the right things in the right places. In addition to the SPMs, press coverage and quotes from the reports are useful salient points which add weight to the reasons for their policies.

'The Synthesis report would have been the most useful because it just brings everything together and we are you know, a public facing partnership and we run projects across the sectors of domestic energy efficiency, business resource efficiency, and increasingly community energy. So we don't really interact with academic institutions and we don't provide specialist technical services. So the detailed findings in WG1, 2 and 3, that's more information then we can actually use in our day to day work.' (LP1)

Generally the IPCC reports are seen as the authority on climate change and provide the evidence base to inform background for local policy making as well as a useful tool for wider stakeholder engagement with some of the IPCC resources used and shared. The WG reports themselves are widely used, although not on a regular basis, as well as the SYR, with *'its own easy to read summary, accessible summary (…) a hugely useful tool for us'* (LP1). In addition the IPCC website, briefings, quotes from the launches and 2-page summaries are also considered valuable.

The headline findings are considered to be very useful as some of the details of the reports (e.g. detailed scenarios) can be in technical language which is not always suitable for their audience and requires a level of translation and detailed explanation.

Interviewees used additional resources to complement the IPCC findings and to address some of the language and accessibility issues highlighted, particularly briefings provided by DECC. It is interesting to note that the IPCC resources

are used on a continuous basis, not just around the launch of the reports; this is true for AR4 where LP3 '*used a lot of the images and diagrams that they make available alongside the report. Historically I have used that kind of material, but I haven't with the AR5 yet*'.

'Case studies examples of work and the impact of severe weather on communities and businesses, (…) anecdotal evidence from business owners, land owners, farmers of how things have changed in their lifetime and why they've taken the action that they've taken. That's often really helpful. It's much less scientific than the IPCC information. We have got some resources in terms of (…) data produced by the Environment Agency. (…). Lots of evidence relating to the science as well, relating to the practicalities of taking the action. The things we need to do to combat and adapt to climate change are sensible measures in themselves. Lots of the arguments persuading people to do things differently aren't based on the science. It's much more of a gut reaction and very local economic argument.' (LP7)

Language, accessibility and clarity: Generally, IPCC reports are rated highly in terms of clarity, are considered to be high profile and providing a stamp of endorsement on the evidence on climate change which is significant for their audience. Overall there is a clear dominant message and headline findings in the reports, particularly on the evidence of climate change, impacts and human agency which can help when thinking about local policy.

'It's very useful in the clear sort of headline findings but then a lot of the detail of the report is sometimes couched in quite technical language; paraphrasing or explaining to a less informed audience was part of my role in the council and because it's the IPCC's role is to review a wide range of studies carried out by researchers across the world it summarizes things in a way that it's very likely, or highly likely that "x" will happen. Some of the things are quite general and then others relate to specific scenarios that are quite difficult to unpack, so I suppose the official answer is yes, I do find myself either interpreting or explaining a lot of the messages in the report rather than quoting directly. I suppose it would be more helpful to me trying to communicate to council, schools, average members of the public in Cambridge, if those things were expressed in slightly more layman's terms with more concrete figures about the changing climate or rising sea levels or and that sort of thing.' (LP6)

When it comes to going into the detail of the reports however, it becomes a lot more difficult to follow and is less accessible. In terms of language, they are perceived as 'heavy' and as a result of this it is expected that the reports are not widely read. If the aim is to reach a wider audience then the reports need to be much clearer. The Suffolk Climate Change Partnership for example engages with different audiences on impacts at a local level and what people can do, and in that (local) context, the IPCC reports are not as useful for that audience and purpose in mind. This is when internal briefings and translation of the reports is necessary. However, it is important to note that in general interviewees have seen an improvement in the language in the IPCC reports, particularly around more certainty of anthropogenic change and impacts and managing uncertainty future changes. In addition the IPCC is '*talking to all countries*' (LP3) and so national government briefings from DECC helped translate the global picture to a national context.

Part of the reason I had to change languages is because of the nature of my audience as opposed to the audience of the IPCC. The environment agency is very England centric, and also very focused on only certain impacts. In some things, part of the language change that I had to make was to reflect my specific audience, just to be a bit fairer.' (LP3)

The messages are clear for most of the interviewees when it comes to adaptation to impacts and mitigation. However, most interviewees who engage with the IPCC reports are used to reading scientific reports about climate change, and hence it is felt that non-expert audiences would be unable to comprehend the content as well. It is viewed as useful to have different likelihood terminologies, and snapshots of examples of impacts (temperature, rainfall etc.) are seen as very accessible. However, it is still found to some degree to be heavily research focused. There is a slight discomfort around communicating terms such as 'very likely', and percentages are deemed much easier to communicate. The graphs in the reports in particular helped make the reports more accessible to visualise the data and demonstrate the changes clearly.

Most of the people employed to use the IPCC reports, and indeed those that were interviewed had experience of working with scientific data, academic research or indeed the IPCC reports themselves through education (e.g. an MSc in Climate Change) which meant that they felt they were equipped to understand the content of the IPCC reports and adapt that to their work. There was widespread agreement that for those without a similar background, the reports were less accessible and resources such as the SYR and its summary were of most use.

5. Additional quotes

Recommendations - 2 page summaries

'The fact that the Synthesis report came with those one or two pages ... a two page summary of essential messages and I think that's absolutely critical. So I think that's the approach that I'd recommend (…) an easy reference for what the reports are. Where they've come from. To make it clear how credible they are. To give an understanding to general audience of the significance of these reports. How many governments have signed up to them and perhaps an idea of the peer review process which goes into the production of the papers which formed the back bone of the summaries, so that people can get a feel for the context and I think that we're constantly bombarded as the general public with findings from papers as they come along and then appreciation of just how many different papers have gone into these summaries.' (LP1)

'A double-sider that might have changes of rainfall, changes of temperature, because the summary notes that I've been in receipt of before are still 40 pages. That makes it quite hard to read. When you're in the position like mine, which is interested and has a lot of background in relation to climate change, but isn't the premise of my job, you need to have quick, accessible information that you can go to in between meetings or I don't know. Maybe your lunch break or at the end of the day when you're in a position when you can do a bit of reading. Having a 100 page document or a 50 page document means you really have to be vested in that subject matter, and it has to be essential to your work. Taking that aside, if you had a double sider and you wanted to read that as part of a different piece of work that would inform that, that would be much better.' (LP5)

'Shorter summaries of the reports that had the broad headline findings and supported by some key kind of statistics and facts that would be very useful to me in writing the council's climate change strategy… I suppose it is about how the information could be presented for generalist policy makers like me rather than specialists.' (LP6)

Recommendations - making it local

'If you wanted to make it easier for local authorities for example, I really think it needs to be broken down a lot more into what specific messages local authorities can take from it.' (LP4)

'Very local experience is that because it's announced at an international level that makes it easier to dismiss locally, "That's just something that they're talking about in some foreign country miles away. It doesn't really affect us."' (LP7)

'Having some sort of local champion who is championing that message with examples that mean something to people living in this locality is something that would really help me. I think a network of local champions, people of standing that are saying, "This international announcement, these reports, have relevance to us here in Suffolk because X, Y, and Z." That's something that I think would certainly bring more residents to the information locally.' (LP7)

'We've invited UK-based contribute in authors to come in and give a webinar series on each of the reports. Those have been incredibly popular with staff.' (LP3)

'I'm a bridge between what is quite a dense rich document, and something that is suitable for my audience.' (LP3)

'Any material that is produced that is trustworthy and can be passed on, that we can use to communicate the message, is really helpful' (LP4)

Recommendations - the role of digital technology

'I definitely think the use of digital technology could work wonders for them because ... When you download the report in its entirety it's just massive, and it's a massive turn off to anybody who's job is ... Digital technology is great for breaking things up and helping navigate people to the right things that they have to read.' (LP3)

'Hardly anyone outside of academic circles will open them. So they're not accessible documents but the general public could have a means of making them more accessible - interactive technology and digital technology would be a huge leap forward for the IPCC.' (LP1)

'You have a video that could be just a short briefing that local politicians could watch. I think it's more about having something accessible or someone who's willing to come around and quickly talk us through the update. We are quite willing if it is really offered. I think we are quite willing to give briefings and learn about these things. (…). We get hundreds of press releases about everything. Really the offer to have something, a 20 minute video or something, that we can show at the beginning of a session, I think something like that could be helpful.' (LP4)

'There needs to be consistent updates to stuff. There's no point having a report every three to four year or every year. It's almost like ... We rely on social media these days, so it's almost like new pieces of information that come out, new pieces of analysis could be put in a synopsis and put out on social media so you can access that quite quickly, and it'll stimulate thinking on a day-to-day basis.' (LP5)

'Charts and graphics in the report, (…) if it's possible to make those sort of more interactive by digital means, I think that would be really helpful and I think also maybe presenting some of the information more in terms of info graphics rather than large amounts of text might help, and I suppose if the IPCC is looking to move some more to the digital platforms then perhaps that makes that easier to achieve.' (LP6)

Recommendations - the role of communications specialists

'It's all a matter of which audience you're wishing to hit… If you're going to have specialists' comments, you're then going to be looking at just focusing, perhaps upon various channels of expertise, aren't you? So, which sectors do you look at? And do you get your agricultural experts in to do their piece? I feel that the outcome needs to be more focused... Maybe that could be useful, but you'd need to choose the sectors which you wanted the experts to comment' (LP2)

'Talking to the policy makers at the different levels about how useful they find the report and actually those sorts of things and trying to develop products that meet different people's needs. I think it would be very helpful. I recognize that I'm working in a particular context in a district council and maybe you're working in a government department or an engineer might have very different needs and I think that they probably need a range of approaches to help inform policy at different geographical levels and within different organizations.' (LP6)

'Even communication specialists, I have a little bit of a love-hate thing with my phone communication specialist, in that you sent things often it comes back completely reworded and scientifically wrong. I think that is a massive challenge. I think it's okay to produce outputs that are for a more technical audience. I think there is a place for that. I could think of additional products where there's more effort put in by communication specialists to make them more user-friendly and accessible. You have to accept that you lose something by doing that so you would want to do that for the whole process.' (LP3)

'… They could employ communication specialists throughout the process rather than just at the end. If you have embedded the common heap on the writing group all the way through, then you might not have that dichotomy between communication and technical access. They would've been part of the process and learning throughout the process. They may as well do that, I don't know, but you certainly don't hear about that. The focus is always on the science, and perhaps there's more effort to be put into how communications is incorporated from the beginning.' (LP3)

What gets used

'The background stuff in relation to general temperature rises and sea level rises and other things like that were quite useful. It was the graphs really that were being presented as part of the report.' (LP5)

'I've been looking at the Synthesis report… Broadly it is something that I'm referring to when I'm developing the new strategy as well.' (LP6)

'I went to the reports themselves, and as I say, in combination with the briefing material (…), these were the things that I used. I did actually have drafts of the IPCC reports which meant that I could be prepared for publication day. Then I only went to the final published report to check that what I prepared in advance was still in fact okay.' (LP3)

'I might quote from some of those summaries and then the language that's now being used and the very helpful highlighting of those key statements in the summaries has been useful in that you can go and quite easily pick those salient points out and drop them as quotes from IPCC into the forward and headers of some of the documents that we might produce on a regular basis, that add weight to the reason why we're doing what we're doing.' (LP7)

'I used quotes from the launch where all the main leaders had a quote on how important the report and the process were. We would maybe use something like that in a debate for example. That's probably when we would use, not press releases, but you can get the speeches of the launches. That's something I've had a look at' (LP4)

'IPCC website - I have looked at some of the fact sheets but primarily the ones that explain what the IPCC is, who and what it's methods are, and what the process it follows has been just to help me understand where it fits in the climate change policy field.' (LP6)

The language of the reports

'If these reports are going to outreach to the main stream audience, then they really do need to come with much plainer language' (LP1)

'It's always very difficult, presenting a technical subject in language that can be understood by the layman (…) and I think it's found a very good middle ground. The layout (…), the presentation of it all (…) it's a lot easier to find the bits you need' (LP2)

'I personally don't feel entirely comfortable with the formulation of very likely, this whole ... I'd feel more comfortable with a percentage because I think it's much stronger, but then I know that the public might not understand it as well. Personally, I feel the wording around the certainty percentage, or ... If you have a 90% certainty or a 99%, I think the very likely is a little bit weaker to me compared to numbers, but that's me personally, I think.' (LP4)

'I think it was the graphs actually. I think it was the accessibility of being able to see the data in a graph'. (LP5)

'I think the overall methods are very clear. I think the headline findings are very clear. It helped me to look at the press reporting on some of the reports because that expressed it in more general language than the slightly scientific language in the IPCC report. (…) It's when you dive down into the detail of the report (...). It's much more difficult to follow.' (LP6)

'In the summaries it feels less scientific. It feels more accessible, and it feels more directly related to people's lives, which when we're dealing with ordinary residents of Suffolk, when we're dealing with Councilor representatives and the people of Suffolk at different levels, then that's absolutely crucial. Whilst the science is obviously incredibly vigorous and well researched, it's quite dry and boring to be able to go into the detail of that with people. If you've got clear, concise statements that are easily accessible and understandable by the man in the street, and give a clear message that feels like it impacts on their day-to-day life, then they're useful in helping you make an argument about why you're doing something.' (LP7)

6. List of Interviewees

Local Policy 1 (LP1): David Walton, Suffolk Climate Change Partnership

LP2: Paul Hinsley, Essex County Council

LP3: Molly Anderson, Environment Agency, Climate Ready

LP4: Sandra Boegelein, Norwich City Council

LP5: Michelle Burdett, North Norfolk Council

LP6: David Kidston, Cambridge City Council

LP7: Matt Hullis, Suffolk County Council

4.1 Governments and Policy Makers

Case Study 2 – Policy makers in developing countries

Main points

- The CDKN 'model' of having ring-fenced financing for the project and having 'absolutely terrific' IPCC authors working with the CDKN research teams in an individual capacity worked particularly well.
- The national policy dialogues held in different countries created demand for similar, more devolved work outside of the capitals (especially in the case of India and Pakistan)
- The IPCC reports are 'getting better' in terms of clarity in comparison with AR4, although there is still some way to go; the Synthesis Report is to be highly commended.
- There were not enough relevant case studies for a particular sub-region (of Asia for example) which would have brought an issue alive to an audience.
- As a result, the CDKN authors did rely almost exclusively on the AR5 reports, but occasionally included other information in text boxes on a particular point that came from their own sources or another report.
- The IPCC's production of short videos on the key findings was a good development.

Recommendations

- There is a huge demand for more information at the regional and sub-regional level, not just amongst governments and policy makers, but amongst the business sector and civil society too.
- Having more than two IPCC authors to call on would have been helpful to spread the load of advice in preparing the derivative reports.
- More consistency was needed between the three WG reports, particularly on the issue of the decarbonisation pathways and the mixing and matching of Carbon, CO_2 and CO_2 equivalents in calculations of the carbon budget.
- It would be good to have available on the IPCC website short individual news clips which people could use in their own communications.

This case study is based on the experience of the alliance of organisations known as the Climate Development and Knowledge Network (CDKN). They work in more than 70 low and middle income countries in Asia, Africa and Latin America, and have more intensive engagement in about 13 of them.

From July to December 2014, they organised a series of policy dialogues with key policy makers in several developing countries based on the information found in the IPCC AR5 reports, so that the latest climate science could be better incorporated into decision-making. They also produced four regional reports which distilled the key messages of AR5 for three different geographical regions (Africa, South Asia, and Latin America) and one generic group of countries (Small Island States). So for example, the report 'What's in it for Africa?' was a 79-page report based on WG1-3, which was reduced to 35-pages in an executive summary.

Alongside these reports, CDKN presented a 'Media Toolkit', a bundle of resources available for education and reporting purposes to encourage understanding of the AR5 reports. Details can be found here: http://cdkn.org/ar5-toolkit/. The site included infographics, presentation slides and shareable images.

Key features of the CDKN work were:

- AR5 authors could speak directly to policy makers in the policy dialogues.

- These dialogues included representatives of different sectors in different countries, including Environment Ministries, Planning Ministries, bilateral and multilateral agencies, the president's office, international and national NGOs, and think tanks and research institutes.
- Journalists were also targeted as a sub-group for training sessions.
- The authors of the CDKN reports were able to work closely with two IPCC authors working in an individual but professional capacity (see below for details*)
- CDKN had access to early drafts of the AR5 reports which allowed them to start work in preparing materials before the actual launch date of the individual reports.
- Their work was funded by an outside organisation, in this case DFID (the Department for International Development in the UK).
- CDKN could draw on their experience of doing a similar job with the 2012 IPCC SREX report on extreme weather events.
- The creation of their own infographics (with an outside designer) that used IPCC raw data, summarised different trends and were downloadable from the CDKN site, were particularly successful.

* Although there were several authors of the four reports CDKN produced, two IPCC authors made substantive contributions: Yacob Mulugetta of the University of Surrey and Maarten van Aalst of the Red Cross Red Crescent Climate Centre. Dr Mulugetta is a Coordinating Lead Author of the Fifth Assessment's Working Group III report (chapter on energy systems) and member of the core writing team of the *Synthesis Report*. Dr van Aalst is a Lead Author of the Fifth Assessment's Working Group II report (chapter on regional context) and *Technical Summary*. He was also a Coordinating Lead Author of the IPCC's *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (SREX, chapter on determinants of risk), and member of the core writing team of the SREX Summary for Policymakers.

Selected quotes from Mairi Dupar, Global Public Affairs Coordinator at CDKN and project leader for the CDKN derivative reports and outreach work:

On regional-level case studies:

'The AR5 will have a message like there are increasingly more integrated adaptation-mitigation-development approaches by governments around the world, increasingly in Asia. But then it won't really give you that many case studies from the Asian region. The region is so massive and the example it might give you in its little box is from Vietnam or Fiji and you're doing all your outreach in South Asia and you're thinking "Gosh, how am I going to illustrate that? The example from Fiji isn't going to fly for all these policy makers in Delhi". So, we did include more material in our tool box, if we had a really illuminating case study that makes exactly the point. It would obviously be great if the AR5 itself could give all the supporting material.'

On clarity:

'I do want to go on the record as congratulating IPCC for improving over the last assessment. You can look at AR5, you can look at the policy maker summaries and you can feel to a certain degree perplexed by the technicality of some of the language, but it is improving assessment by assessment definitely. And they should get credit for that.'

On IPCC authors:

'Having Martin and Yacob <the two IPCC authors> on board, they were absolutely terrific and so supportive, constructive, and understood exactly what we were getting at in terms of communicability and yet very aware that there were certain lines that you couldn't cross in order to maintain scientific credibility.'

On infographics, the tool kit, and spreading the message

'One of the things that have been super successful from the CDKN project was our creation of infographics that summarised the different trends and were downloadable from the site. We've have lovely e-mails from users all over the world saying, "We downloaded your infographic on historic climate trends and future projections for Latin America. Now we're building it into the Mexican school syllabus". That's really great stuff. They say: "We're using your PowerPoint slides for staff all day training on AR5." So the possibilities that we've had to create these pieces of communication toolkit and use them to empower climate champions to go out and spread message has been really great.'

4.1 Governments and Policy Makers

Case Study 3 – the FCO in the UK

Main points

The usefulness of the WG reports:

- The reports are 'incredibly useful and absolutely invaluable for my work – without them, I would have to read all the science papers that go into them.'
- The interviewee draws on the AR5 reports and other reports to write a 1-2 page summary with headline messages which goes to the minister and UK embassies. Some of his equivalents in other governments also write summaries of the AR5 reports (typically from the SPMs) for their ministers.
- He also relies on World Bank reports, the UNEP ('Mind the Gap') reports, Royal Society reports, and the reports written by the Potsdam Institute. Some of these are more helpful for understanding climate impacts and what needs to be avoided; they are also more readable and better edited.

***Language*:**

- The use of risk language in the WG2 report was helpful, but the risk assessment concepts did not seem to have actually been applied to the substance.

***Graphics*:**

- Some of the IPCC graphics could have presented the information (on the climate 'pause', for example) more clearly.

Key recommendation:

It would be better to start with the policy goal (for example preventing or reducing the risk of a worst possible case happening), and work backwards from the goal to the science that is relevant to it, rather than starting with the science, and trying to make it policy relevant. Or in other words, start with the question 'what is it that we might want to avoid?', and then work out the probability of that happening. That's what is done for example in other areas such as terrorist attacks.

The Foreign and Commonwealth Office (FCO) is one of several UK ministries that pay considerable attention to the IPCC WG reports, along with DECC, Defra, and DFID. Climate Change has been a major policy priority for the FCO in recent years.

Simon Sharpe Head of Climate Risk Team at the Science, Innovation and Climate Department at the FCO, was the interviewee. He gave more context and explanation to his points above in the following ways:

- A different approach to climate science would be more useful in informing a risk assessment. Climate science results are typically presented in the form of prediction. In prediction, probability is the most important variable. Probability is usually fixed (corresponding to 'most likely') and graphs plot severity as a function of time. Nearly all of the graphs in the WG2 contribution to AR5 are in this format. However, in risk assessment it is the severity of impact that is most important. After a 'plausible worst case scenario' has been chosen, corresponding to a fixed point of severity, its probability is then considered. The corresponding approach for climate change would be to plot probability (of crossing a relevant threshold) as a function of time. AR5 WGII only contains one example of a probability / time graph (on destruction of coral reefs); this is a good example of clear assessment and communication of risk, and shows it can be done.

- Other non-IPCC graphics did a better job of separating out (the small slice that is) land, ice and atmosphere from the oceans, which explains how over the last decade heat has been transferred more efficiently to the deep oceans, offsetting much of the human-caused warming at the surface. See for example, http://www.theguardian.com/environment/climate-consensus-97-per-cent/2013/sep/09/climate-change-arctic-sea-ice-delusions)

Four examples were given of more relevant and detailed material 'of worst case scenarios' useful to politicians – the sea level rise we are already committed to according to different pathways; the heat stress effect on the human body; the risk to crop production of upper end temperature rises; and (more consistent) figures for (the upper end of) global temperature increases.

4.2 The Business Sector

1. Main points:

- The IPCC reports were seen as important and very authoritative. They were consulted by three of the four interviewees to support and inform their work within their companies. As one of the interviewees remarked, 'If the planet was your child, and you had all these reports, you sure as hell would do something about it'.
- Two of the interviewees used them as the basis for short briefings for their colleagues, bosses or clients. One of them relied on a 'derivative product', but the fourth hardly used them at all.
- The Synthesis Report and the SPMs were the main IPCC products which were read or consulted. The SPMs were mostly seen as being too long and too detailed, without enough specific information to help them understand what the implications or policy options might be for their business sector.
- In particular, there was not enough up-to-date and relevant information for investors and financial institutions, written in a language that would be meaningful to this sector.
- Several detailed examples were given of risk calculations, geographically-specific information, scenario planning, or financial risks that would be of use to different business sectors.
- Other reports on climate science or climate change were seen as good examples that were helpful to the business sector for the sort of information they contained (sector-specific), the language they used (business-friendly), and the shorter length of the summaries.
- All the interviewees were aware of the special reports ('derivative products') produced on the back of the IPCC reports as part of a joint initiative by the European Climate Foundation and the Cambridge Institute for Sustainability Leadership (CISL) in the UK, but they were used to differing degrees. However, those who did look at them praised the use of infographics and sector-specific information.

2. Recommendations:

- If the SPMs continue to be the most favoured information tool, then shorten them and make them less complicated.
- Another 'layer' of communication is probably needed for the business sector, the most useful being a short summary briefing of 1 - 5 pages, probably with infographics.
- The information needs to be made relevant to specific business sectors.
- There are some sectors, and in particular finance and investment, and tourism, where relevant and up-to-date information is lacking.
- The language of any additional briefings or reports and the concepts used in them need to be business-friendly. Risk language and concepts are generally useful, but perhaps not in the way they are used in the IPCC reports.
- IPCC communicators or their collaborators need to identify and target key influential figures in different markets and sectors who are known to be concerned about the implications of possible climate change impacts.
- Ensure more consistency between the Working Group reports, and in particular make sure that Working Group 3 was more related to the topics covered in Working Group 2.
- Digital technology: the right sort of infographic is seen as a very powerful way to draw business audiences into being 'carbon literates'.
- Specialist writers: The IPCC or their collaborators need to include in their teams a mix of experts in the particular sector they are targeting, who both know the relevant market and are good at communicating to it. In particular, invite some investment bankers, financiers, and pension planners.

  Another option is to bring in more people from a business background within an academic institution. Their main task would be to write a 'business narrative' which could make the science come to life.

3. The importance of the business sector

The business sector is viewed as crucial to international efforts to reduce carbon emissions and set the world economy towards a more low-carbon path. Several commentators have observed that one central difference between the political context behind the Copenhagen summit in December 2009 and the forthcoming Paris summit at the end of 2015 has been the increasing presence of business voices in the climate change debate. A number of high-level meetings have been held specifically for business leaders on the subject of climate change, most notably Ban Ki-Moon's climate summit in New York in September 2014 and the UNESCO Paris meeting on business and climate in May 2015. The annual Davos meeting for business and political leaders held in January 2015 also had a large component of discussion about climate change built into it.

Several reports have been published in part or mainly aimed at the business sector, most notably the 2014 Risky Business Report in the USA, and the New Climate Economy Report in 2015. UNESCO, UNEP, the World Bank and the UNFCCC secretariat have all reached out to this sector. Several commentators and business leaders have noted a clear shift in business attitudes towards climate change in recent years. Paul Polman, the CEO of Unilever, notes that 175 CEOs were at the New York climate summit, 1,000 CEOs have signed up to the World Bank's call for a price on carbon, and 75% of major companies now report regularly on their carbon footprint.

Several fossil fuel companies, notably in the USA, remain resistant to the promotion of alternative renewables and to taking radical action on cutting emissions. It is indeed difficult to assess how many companies would be willing to embrace a low-carbon agenda. However, many would agree with the comments of one of the interviewees that awareness and desire to change amongst some important business leaders has increased:

> *'I start with the general premise that the role of business in climate change negotiations is finally being appreciated. People are waking up to the potential of business. Businesses are a little bit of a canary in the coal mine when it comes to climate change, as they are starting to see the impacts on their cost-base and supply chains. Many businesses now want a strong response on climate change, in contrast to the fossil fuel-dominated mood music seen in previous COP discussions where the business view was pretty one-sided in denying that climate change is happening. There is now a positive desire amongst business leaders to play a proactive role in supporting a strong outcome in the COP discussions.' BS3*

Two representatives were interviewed from the finance and investment sector, and one each from the pharmaceutical and retail sectors. The key advantage was that all four were familiar with climate science and the implications for their companies and sectors – but this was also a limitation as their companies were not necessarily representative of their sectors in their belief in the need to address the energy and climate challenge. The four interviewees also worked in different parts of their companies, so their answers were clearly affected by what was needed in their particular job. Also they were all familiar with reports on climate science and the language and concepts typically used in them, whereas this would not be true of their colleagues. Finally, the different sectors are affected in different ways and to different degrees by climate change. As one of them expressed it, 'climate change is not an existential threat to the pharmaceutical sector as it is for the oil and gas sector. Energy represents less than one per cent of our costs, so it is not a strategic or political threat. However, we want to be able to show we have a good corporate response to the challenge.'

Representatives of the following four companies were interviewed:

Aviva has a long history of leadership on responsible investment, and more recently has had a strong focus on the role public policy can play in shaping market behaviours in response to climate change. Aviva is one of the recognised leaders in this area within the financial markets.

GlaxoSmithKline has been successful in applying its supply chain engineering to achieve significant carbon reductions. It figures prominently on the Carbon Disclosure Project's FTSE 350 Climate Disclosure Leadership Index.

Marks and Spencer (M and S) is another sector leader due in part to its publication in 2007 of its sustainability plan known as 'Plan A', which unusually for that time was accompanied by specific targets and a five year plan. It has been an important leader in climate change and business debates in the UK and beyond.

Kepler Cheuvreux is a one of the largest independent European financial services companies specialising in advisory services and intermediation to the investment management industry. This includes long-term institutional pension funds. It gives prominence to the analysis of the economic impact of climate change on the investment community.

In addition, we looked at the short briefings written by HSBC for their clients on the basis of the IPCC reports. In 2007 HSBC set up the Centre for Climate Change Excellence whose aim is to analyse and communicate the long-term commercial consequences of climate change for the HSBC Group and its clients.

Semi-structured interviews included questions on the three key areas (usefulness, clarity of language and messages, and recommendations) and on their 'big picture' views on IPCC communications and their use of the derivative products written for different business sectors by the CISL.

4. Briefings by the Cambridge Institute for Sustainability Leadership (CISL)

All four interviewees mentioned the briefings produced by the Cambridge Institute for Sustainability Leadership (CISL). These thirteen briefings, usually of 16-pages in length, were deliberately aimed at eleven sector-specific businesses, namely Agriculture, Buildings, Cities, Defence, Employment , Energy, Extractive & Primary Industries, Finance & Investment, Fisheries & Aquaculture, Tourism and Transport. They are available at http://www.cisl.cam.ac.uk/business-action/low-carbon-transformation/ipcc-briefings/climate-science. The first, published before WG1 came out, explained what the IPCC is; one was published after WG1 and covered its contents; the remaining 11 were published after WG2 and WG3, and were sector-specific.

The eleven reports contained a one-page summary of the physical science (taken from WG1), the essential findings relating to the sector, and an infographic. In some cases, the reports were produced with the help of sector-specific partners such as BPIE (Buildings), BSR (Agriculture, Transport and Primary and Extractive Industries), ETUI (Employment), ICLEI (Cities), IIGCC, UNEP FI (Investors and Finance), Institute for Environmental Security (Defence), Global Military Advisory Council on Climate Change (Defence), Sustainable Fisheries (Fisheries) and the World Energy Council (Energy). Each was written by a writer familiar with the specialist field. All were reviewed both by subject specialists (in most cases, academics involved in AR5) and by business sector specialists – the idea being to ensure they were both accurate reflections of AR5 and written in such a way as to be relevant to the sector audience.

They are also important because:

- They are viewed by the IPCC comms team as a paradigmatic example of derivative products which worked 'very well' for a specific target sector.
- They are seen as a possible model for the future where the IPCC cannot formally endorse them, but can encourage them, support them and have some involvement in their content.
- They may also be used as a model for briefings provided for other target sectors, where key interest groups, scientists and science writers join forces to produce material of relevance to that sector.
- They were funded by an outside organisation.
- They were widely praised by scientists, corporate leaders, military strategists, financial analysts, and sustainability and conservation experts as a vital resource for companies wanting to plan for the future.
- Official tracking by the CISL project, involving customer feedback and download metrics, suggests that the reports were widely used by different businesses and other sectors.

All four interviewees were aware of the CISL briefings, but they varied in how much they used them. The representative of M and S in particular strongly praised the use of infographics.

> *'They were useful because they had good infographics, they were sector-specific and they used a language that was appropriate for the business sector. We distributed the CISL infographics. They brought these reports to life, and were very powerful. And you can sneer a little bit and say, "Well, it's not scientifically pure. It's just a few pictures and a few facts and figures." But, as an entry point into the IPCC process for most business leaders this is very effective and very powerful, not least because they were sector-specific. They thought about the impacts on tourism of food and mobility. That's how business leaders see it. They don't think generically as business leaders. They think of, "I run a food company. I run an airline. What does it mean to me?"* BS3

However, the writers or consultants who turned the IPCC reports into the short briefings found this task difficult, even 'immensely challenging' in the words of one of them. The criticisms centred on four main areas:

- The sheer volume of general information made it difficult to sift it down to relevant pieces of information for specific sectors

- There was a lack of consistency between the three WG reports, for example the disproportionate amount of information given to some subjects in some of the reports compared to others
- Up-to-date or relevant information was lacking in some key areas (e.g. finance and tourism)
- Businesses kept asking the 'so what?' question, and wanted to have more solutions rather than understanding the assessments and options.

5. Other reports on climate change

All four interviewees mentioned other reports on climate science and climate change, which in some cases they thought were more helpful to the business sectors for the sort of information they contained (sector-specific), the language they used (business-friendly), and the shorter length of the summaries. The Risky Business report and the New Climate Economy report were both mentioned by two interviewees. For example, the first Risky Business Report (available at http://riskybusiness.org/) focuses on what climate change would mean for three key sectors of the US economy (agriculture, energy, and coastal property and infrastructure). Follow-up reports highlight the risks to industries in California and the mid-West. The New Climate Economy (http://newclimateeconomy.report) focused on three sectors - cities, land use and energy. Examples were mentioned too of specific reports written by companies such as Standard and Poor on the risks from climate change to a country's ability to pay back its sovereign debt or by investment industry experts on the need for 'Forceful Stewardship' (the need for investors to use their voting rights to require companies to adopt business plans that enhance shareholder value and are consistent with the 2-degree warning).

One interviewee thought the IEA reports were more helpful to business. As he explained,

> *'In my experience most investors are not spending much time on primary IPCC sources; what are more widely read are the IEA reports which are the benchmark for climate investment risk, although they are based on the science in the IPCC reports. For me, the IEA reports such as the World Energy Outlook are my other bible along with the IPCC reports.'* BS4

It is also worth stressing that some companies such as HSBC adapted the IPCC reports into their own (digestible and readable) briefings of about eight pages. These included four or five headline points from the IPCC reports, lots of graphics based on different sources, and a series of tables based on the general idea of 'ten key things you need to know'.

6. Relevant quotes by topic

6.1 General comments on the IPCC and business:

'We have to recognize that the whole IPCC system and COP system has been set up for policy makers, for scientists, and to a degree for NGOs. They are written very much to help policy makers make decisions - that is right and proper. It's not ever been set up with business in mind, which therefore colours how we communicate the potential of business. We have been held back by the lack of business-friendly communication or useful communication tools. They don't talk much about business values, and the creation or the destruction of them. So using the IPCC process we could find better scenarios and better facts and figures that illustrate the likely impact from climate change for a food industry, the tourism industry, the fishing industry. That would then make it more obvious and easy for business to engage with.

I appreciate the IPCC is not party political. It's not trying to make everybody a carbon zealot. It's got to be very factual, down to earth. But I do think business leaders like tangibility, they like the facts and figures which they can get their heads round. But they also like opportunity to talk about risks and supply chains and cost basis. It will only take you so far. So, it also helps to talk about the opportunities of green growth, new market places for product services, and new green energy solutions.' BS3

6.2 Use of the IPCC reports

'We would normally use the Synthesis report and the executive summary, as we don't need the acres of detail. They <senior executives> don't want to read all the bricks' worth of data and information. They want to know it exists, and they want to know it's robust, but they are not going to read it.' BS1

'I don't really read them anymore. They are OK and important. But we have accepted the science, and we are more interested in what governments may sign up to in terms of helping us to invest in a low carbon future. We go more to

the Carbon Disclosure Project <an assessment of companies carried out by PwC>, which does a score on us, and information from the Carbon Trust.' BS2

'I read the SPMs from the three reports that came out from the IPCC, and I had a reasonable layman's go at them. But in a very busy life, I'm constantly leaping to the question, "But what does this mean for M&S or for the sector that I'm in?" Because I'm professionally interested with a chemist's background, I can just about cling onto the science. I lumbered through to the end of them, which I probably didn't have to.' BS3

'I read the Synthesis Report, a very helpful and useful document. I read the exec summary which I find clear in terms of headline takeaways. It is seldom necessary to go beyond the exec summaries – the reports themselves are very chunky. The table and charts in the appendices are also useful. Climate science is a very difficult and technical topic to communicate to a non-specialist audience <so> I turn all the information into a 2-page summary which is digestible for my clients. In general, most investors would not spend too much time on the primary IPCC sources, but they – and I – use the IEA (International Energy Agency) reports a lot.' BS4

6.3. Language and clarity of messaging:

'I find the executive summaries well-written, comprehensible and digestible to an "educated audience", and particularly the Synthesis Report. The graphics and figures depicting the degree of complexity are good, but I have been following this area <of climate science>for ten years. It would be difficult for people new to this area.' BS4

6.4 Recommendations:

Summary briefings:
'A one-page summary that people know has got a series of six-feet-thick reports behind it is probably all you're realistically going to need.' BS1

'I work at the sustainability office of M&S, and so I as much as anybody else in the business world is expected to understand climate change and the implications for business. But, even I struggle with 30 pages, even the 30-page summary of the various 500 page reports. Businesses just do not operate in a world where they read even 30-page reports and the text and all the science. You never want to lose the depth and quality of the science in the IPCC process; you never should get rid of the 500-page reports and the 30-page summary – they are sacrosanct. But you also need a third tier of communication on top of it, which could be another summary.

We need 2-5 sides with a good infographic and written in a business-friendly language as opposed to just lifting chunks of paragraphs and try to butcher it all together. It needs almost to be written as a new document. That's the best way forward.' BS3

Making it relevant to specific sectors
'What they're missing is depth when it comes to how the information plays into the specific audiences that they are trying to influence. *In particular, from an investor perspective, what is the value at risk associated with their various scenarios?*

In other words we've got GDP estimates when it comes to things like the Stern Review, but no one's has then said that if it's going to be 20, 30, 40, 50 percent of GDP by 2050, then this means that people's pensions, savings and investments will be at this kind of risk. In the fund management world we talk about value at risk, and there isn't a value at risk assessment associated with climate change. The IPCC themselves should have a view on how a particular scenario maps out in the investment world and this is therefore why individuals should be concerned about their personal pension, their investments and savings because the practical, physical ramifications of such-and-such a scenario is pretty dire.

They're missing a massive trick to make the work that they do relevant even to investors. To make it relevant you have to say what it means in pounds, pence, and cents – not GDP because that's the flow of capital, but stock of capital, and assets management.

<Take the example of> sovereign debt: You could create scenarios that would extend the scenarios that exist into the world of investment and say these are the physical consequences for various asset classes. Countries that are particularly

dependent on low-lying agriculture or a low-lying economic activity in order to be able to repay their debt would find it harder to repay their debt. Credit ratings will suffer as a consequence. The valuation will go down in all likelihood.

Take property investment in houses, commercial real estate like office blocks or large properties like the kind of things that you go to at Tesco's, or the logistics infrastructure that IKEA might use. That's the kind of property that large investors will look at. Some of that will be exposed to drought or flooding. If you have invested in infrastructure around ports and it is threatened by sea level rise, that's a big problem.' BS1

'<When targeting the business sector> do not try and lump all business leaders together. I think you should target a food leader or clothing leader or whatever it may be. So, the 'new climate economy' report was very good for a certain type of business leader like a Paul Polman <CEO of Unilever>. So even though Paul is from the food business sector, he is a much bigger thinker than that about the role and the future of business. But he is a-typical. For the Polmans of this world the new climate economy report works well, but for the average chief exec or director of a big business, the reports need to be slightly more sector specific.' BS3

'I'm looking for three things: mood music, specific risks and geographically relevant information. So the first thing I'm looking for is mood music. So I sat there thinking how much play <these reports receive> in the media, amongst my investors, the NGOs and opinion formers which affect my reputation. If an IPCC report comes out and says things are happening much quicker than expected, everybody needs to respond quicker, I'm thinking about mood music that says whatever M&S is doing on climate change, we need to just move it on faster. It's not telling us what to do but it's telling me the mood music.

The second thing I'm looking for is something a little bit more tangible, that starts to talk about specific risks, the likelihood of extreme weather events and supply and changing 10% more than they expected, fish stocks are going to drop by 20% - things that my business colleagues can connect with.

The third thing I'm looking for is probably something around geography. Realistically, however a big business is, there's always going to be certain geographic locations where they sell or they have supply chains that are more relevant than not. So I'm looking for what does it mean for Indian cotton production for example, particularly relevant for a clothing retail outlet like M&S. What does it mean for Kenya where we get an awful lot of flowers and beans from? Or what does it mean for the African coffee industry? So I'm looking for geographical risk.' BS3

'It's a tricky balance both to keep the <soundness of the> science and to break them down into digestible reports. But it would definitely be very useful to have something specific for the finance and investment sector.' BS4

Targeting key people in the business sector

'I think they need to match their messages to their key audiences and adopt them accordingly, and be quite strategic in the way they choose key people within the markets.

I think there are certain people within the markets that they need to make special effort to try and communicate with. I would imagine that the economists who work for brokers would be an important audience, so they need to understand who they are and then make sure that their communications get to them. I would also say that the chief execs of some of the pension schemes, of the insurance companies, of the world's biggest sovereign wealth funds, they are a particularly influential bunch and completely ignored by what is the current IPCC communication strategy.

What I would envisage would be that the IPCC communications people should single out key people within the markets such as key asset owners, chief executives and the like for whatever communication that they can manage.' BS1

Infographics

'Some of the work that the CISL did with infographics on bringing the reports to life was very powerful. You can sneer a little bit and say, "Well, it's not scientifically pure. It's just a few pictures and a few facts and figures." But, as an entry point into the IPCC process for most business leaders it is very effective and very powerful. Things can be improved by just putting the icing on the cake and using those powerful infographics in a sector-specific way.

But I don't want just infographics. They serve a purpose, as the next point after the 30-page summary of the 500-page detailed report. They've all got to work together. But done right an infographic is a very powerful way to draw business audiences into being carbon literates.

Because realistically if you're the director of Women's Wear, who is utterly focused on women's fashion, it's a large-old leap to get to what this climate science means to me. I might be selling a few warmer jumpers in November or a few more macs in June but it's a bit of a leap. There is a more technical part of the business - our technical teams and our innovation teams will read a little bit more deeply. But basically for most business leaders, they need the infographics.' BS3

Specialist writers

'The IPCC should either employ an ex-investment banker to help write the briefings, or work with one investment bank. I'd recommend the former not the latter otherwise the others will see them as biased - somebody who's not just an ex-investment banker, but also someone who's good at communicating to the markets. In the IPCC communications team they need someone who's good at market communications, investment communications, and can tailor the message to those audiences accordingly. I'm not suggesting that they should co-brand them as Goldman Sachs, the City Group, or the HSBC.

If they really want to look into it, I'd be very happy to work with them on it and spend quite some time sitting down and saying look, this is what you really should say. This is how you should say it and these are the key institutions and the key individuals within them to whom you should address the reports. This is the key way of messaging the IPCC reports at the highest level.' BS1

'You might argue this <doing specialist reports> is all beyond the remit of the IPCC, which is fine. But the IPCC needs a satellite organization, a sister organization to which it then outsources the business narrative, and the business case to bring its science to life.'

'I still don't think it should be done by a consultancy. I think it needs to be done by a something like an Oxford <University> or Cambridge or Harvard or Yale or MIT. An institution that's got credibility, is seen as neutral, is not seen as painting an overly pessimistic or optimistic view of the future. It's able to operate as a bridge between the scientists and the business leaders. There's no point in getting another bunch of policy makers in another organization to rewrite policy document for business leaders. There's no point in getting pure climate academics dong it either. I think you've got to have somebody from a business school involved or certainly somebody who is very business savvy from within that academic background. But I do think that the imprint of Oxford, or Cambridge or Harvard or Yale or Princeton, or whoever it may be, is very important in a very political world.' BS3

Risk language

'The value at risk figure might be seven, eight trillion, let's say, of global capital markets which are at risk - the value at risk should the business-as-usual scenario pan out over the coming twenty, thirty years. That's not something they're currently looking at. It's something that they should look at in order to make their key findings of relevance to the investor audience.' BS1

'I think <risk language> is good. And I think instinctively, those that want to avoid action are happy to plunge into this pool. It's all about probabilities and risks and it might happen, it might not, it's too complicated, I'm going to do nothing. I think business by and large is used to managing risk, business is all about risk. So I think business understands the concept that nothing's certain in life, that you investigate, it's a risk profile, and you push the boat out as far as you can. But I don't think the way that the IPCC documents are written is easy for a business leader to translate into business risk. It comes across as very dense statistical mathematics. It talks about the probability of this, that and the other. But by the time I've read to the 16th page of footnotes, I've lost the will to live.

It needs to be a little bit sharper in saying, "look guys, on balance, the likelihood of more extreme weather events in Eastern Africa where you're getting your food from is likely to be 20% higher by 2030." And I know that it's plus or minus 5, 10, 15%, of course I do, I live in that world. But you've just sharpened it up into something I understand.' BS3

'Most of us are hard-wired for black and white outcomes so degrees of probability are difficult. I have to find out how hard and fast the recommendations are when they are presented as probabilities. I look at probable outcomes for different years.' BS4

6.5 CISL products

'I'm aware of them. I did see them. They were good. The IPCC seems to have a very big and effective communications approach. If you were to align that with the CISL thinking and update the CISL thinking and include the value at risk and include scenarios that say this is why investors need to be concerned, then you should also target the "Bellwether industries". These are the people you want to be supporting the IPCC work.' BS1

'We did not pore over CISL products, but we did look at them'. BS2

'They were useful because they had good infographics, they were sector-specific and they used a language that was appropriate for the business sector. We distributed the CISL infographics. They brought these reports to life, and were very powerful. And you can sneer a little bit and say, "Well, it's not scientifically pure. It's just a few pictures and a few facts and figures". But, as an entry point into the IPCC process for most business leaders this is very effective and very powerful, not least because they were sector-specific. They thought about the impacts on tourism of food and mobility. That's how business leaders see it. They don't think generically as business leaders. They think of, "I run a food company. I run an airline. What does it mean to me?" So, that's the first observation about how things can be improved by just putting the icing on the cake of using those powerful infographics in a sector-specific way.' BS3

'I am aware of the CISL reports but they are not something I turn to'. BS4

'It was immensely challenging translating the entire AR5 working group reports into short briefings. The main obstacles were:

a) Different information and baselines all three working group reports
b) Disproportion information per subject given in all the reports. As an example – there were two chapters on ocean impacts in working group 2 and almost nothing on mitigation on this subject in Working Group 3. Granted that some of the overall solutions are the same across topics– it was still very challenging synthesising bespoke and targeted subject summaries with an equal emphasis across topics. However, it was also recognised that the IPCC can only use what research is in the public domain.
c) There was very little information on some subjects i.e. for investors and financial institutions. Considering this should have been a primary audience for the IPCC, experts in the field were left bewildered and disappointed by the lack of credible, up to date and relevant information in the specific field and the lack of information that was really on point and relevant to their work.
d) Similar to the point above – many business and sector experts saw the information as too 'general', watered down (i.e. consensus numbers) and out of date to be of huge use to them. However, it was also recognised that the nature of the IPCC process with its cut-off dates for including research necessarily means that it is somewhat out-of-date.
e) Trying to pull together consistent numbers across 6,000 pages of text was near impossible at times and then creating a relevant narrative from it.
f) There is just too much information to be of use – no one can digest or use that much at a time and sifting through it took weeks of research time as well as tracking the numbers and sourcing.
g) Making the science accurate in lay terms - always a challenge – was particularly challenging for some subjects as businesses kept asking – so what? What's the solution rather than understanding that these were assessments and options?
h) The tourism report was seen as facile and too simplistic and way behind current trends and knowledge –it offered very little apparently that was new.

Recommendations for the future would be:

- Ensure there is consistency between the Working Group reports.
- Ensure you have a proper mix of writers on the job from all fields and ask businesses what areas of expertise they need covered - particularly get some investment bankers, financiers, and pension planners.
- Make sure the Summary for Policymakers is just that – get some decent infographics commissioned as part of the process and involve communication people and journalists earlier in the writing and process. Even the Summary for Policymakers is too complicated.

- It would be very helpful if Working Group 3 was in some way related to the topics covered in Working Group 2
- Do a basic comms 101 on AR6. Who is it for? What do they need to know? Who will read it?'

BS5 and BS6

6.6 Other issues

Time span
'One thing that you need to manage is that the time horizons of your average person working in the city, or any financial district, might be three to six to twelve months. Long-term in the city is three years. Until policy looks like it's going to correct this problem, most people currently wouldn't care, which is why you need to get to the clients, the end investor, and say, "By the way, your money and the way your money is currently being invested, the risks that you're actually shoring up to your future retirement are pretty profound. You need to make sure that the way that you charge those that are supposed to be looking after your interests to do so, looks after your very long-term interests and ensure even the things like dirty coal isn't being capitalized".' BS1

Scenario planning
'From this scenario, the 2100 scenario, what is the consequence to the global economy financially speaking? They couldn't begin to answer that. Then, secondly today what are you asking companies that would be exposed to these risks to do? What are your key things that you want the boards of those, of companies that might be in agriculture or logistics or supply chain sourcing or whatever?

If you look at the changing water demand for irrigation and you happen to be a beverage company, what should your board be thinking about? What are your key messages? They weren't able to answer that. I think the human dynamics of climate change is an interesting physical model. For it to be meaningful a company needs to be translated into what should boards do about it now? What would be good practice?' BS1

7. List of interviewees

BS1 – Steve Waygood (Aviva Investments)

BS2 – Richard Pamenter (GlaxoSmithKlein)

BS3 – Mike Barry (Marks and Spencer)

BS4 – Mark Lewis (Kepler Cheuvreux)

BS5 – CISL researcher 1

BS6 – CISL researcher 2

4.3 The media

1. Main Findings

- There was a general recognition that the IPCC communication team did a 'professional' job around the launch of the AR5 reports, particularly in comparison to 2007. The speed of response to requests, the logistical arrangements for the launches, and the setting up of interviews were all mentioned.
- The interviewees work mostly from the SPMs, backed up by the press releases. Some delve more deeply into the WG chapters, some do not.
- The lack of clarity of language in the SPMs is a major challenge for most, and the lack of one or two clear messages is an issue for some.
- All of them see it as their job to turn the language into something more understandable and digestible by their audiences while remaining true to the science. This they felt was achievable.
- Some words or phrases like 'anthropogenic', 'mitigation' and 'climate model' were not considered to be helpful.
- Most the IPCC graphics were seen to be too cluttered for use in the media.
- There were split views on the presence of NGOs helping the IPCC in its communication work and whether the IPCC comms team needed more of their own resources.

2. Recommendations

- All five interviewees were in agreement that it would have been helpful to have had a clear summary of how the AR5 report had taken on the AR4 reports, in terms of new information about the science – for example, changes in ranges for sea level rises and temperature increases.
- Some recommended bringing in specialist writers, whilst others thought it was their job to turn the reports and SPMs into language and narratives understandable by their audiences.
- Some recommended looking at the way the 2014 US Climate Assessment Report was communicated for any lessons that can be learnt about the clarity of language, messages and interactivity.
- Some recommended that the IPCC sessions discussing the reports should be made more open and transparent. A similar recommendation was made about the availability of the draft reports.
- One suggestion was to keep the chapters in the WG reports as they are, but put more effort into making the SPMs more readable; or to aim the technical summaries at the scientific community, and the SPMs at the policy makers and wider public.
- Amongst other suggestions was to avoid Sundays as a launch day; to give each report fewer and clearer headline statements; and to put the credits at the back and not the front of the reports.

3. The media context

We know from survey work that by far the most common source for information about science for the public in most countries is the media, whether it is traditional organisations like the BBC or more recent online-only media. For example, the 2014 study by Ipsos-Mori for the Department of Business Innovation and Skills (BIS 2014) found that 68% of the UK public surveyed first heard about scientific findings from television news and programmes, followed by 24% for all online sites, 23% for print newspapers, and 15% for radio news and programmes (the respondents were asked to name their first or second most commonly consulted source). Other sources came notably lower such as magazines and books (15%), friends and family (12%), science blogs (2%) and social networks (6%), although the last figure rose considerably for the 15-24 year-olds.

We also know that the media are often not only the most used but also the most trusted source of information on science, although the levels of trust can vary between platform, age group and country. (Painter 2014)

The 2013/14 AR5 reports attracted considerable media attention around the world. The charts by Boykoff *et al.*, shows peaks in climate change coverage in the months they were published which suggests strong media interest. http://sciencepolicy.colorado.edu/icecaps/research/media_coverage/uk/index.html) However, there is evidence of significant gaps in the coverage: for example there was very little mention of the IPCC reports on Chinese state television's evening news bulletins, and none on India's largest commercial channels (Painter 2014). There were

important differences within Europe too where Polish television ignored the IPCC reports (Metode 2015), and significant variations between countries in the Global South, where print journalists in Bangladesh, China, Indonesia and Chile paid relatively little attention, whereas Brazilian journalists covered the reports extensively. (Palgrove chapter, 2015) UK broadcasters spent nearly five times more airtime reporting the IPCC reports than US broadcasters. (O'Neill 2015) Indeed, the prominence of the IPCC reports was particularly low in the US media in general. (ibid)

The number of journalists who registered to attend the press conferences for the first three WG reports was significant, particularly in comparison to the release of UN reports about other topics. These were 234 for WG1 (Stockholm), 223 for WG2 (Yokohama) and 143 for WG3 (Berlin). These figures were probably down compared to AR4, and according to anecdotal evidence, fewer Western journalists were present.

However, the volume of coverage still remained high for a climate science story in which, as many journalists pointed out, there was not much that was new compared to AR4. Figures for the UK suggest that coverage in nine national newspapers dropped from around 3,500 articles on climate change for the months in which the AR4 reports were released in 2007 compared to about 1,500 in 2013/14, a decrease of about 55%. Similar decreases were observed in Australia, but not in India. (Painter 2014, p. 46) The volume of coverage dropped progressively from WG1 to WG3, prompting analysis of the possible causes of the decline. (O'Neill 2015) The Synthesis Report also attracted significant attention, but again often less than WG1 and WG2. (Palgrove chapter)

The five interviewees all came from the English-language media. They were chosen as a) coming from highly respected legacy media organisations, b) for being some of the most prolific writers on climate change, and c) for having considerable experience of covering IPCC reports. In recent years, the *Guardian* for example has enjoyed one of the largest teams of reporters and editors writing about climate change. The paper and online site has had a team of six full-time environment correspondents, two editors, a dedicated picture editor, and two production journalists, although this has been reduced in recent months. In part this was driven by the paper's emphasis on expanding its coverage of the environment on its website. In 2014, the *Guardian* published more stories than any other outlet, with at least 1,338 climate stories published – almost four per day. (http://www.dailyclimate.org/tdc-newsroom/2015/01/climate-change-coverage-2014)

According to the same study, Fiona Harvey of the *Guardian* was the most prolific writer on climate change in 2013, along with her colleague Suzanne Goldenberg. Alister Doyle from Reuters and Seth Borenstein from Associated Press are probably the best known and experienced agency reporters on climate change, whose stories are published and translated around the world. This is also the case with Justin Gillis of the New York Times. David Shukman is the science editor for the BBC which is very trusted by the UK population for its general and science news.

4. Relevant quotes by topic

4.1 The Usage of the IPCC Reports

'I covered the press launches, so obviously the SPMs are main document I work from. But the chapter reports all have good stories in them to cover, particularly WG2.' M1

'I work from the SPM. I've read a few of the subchapters, but not very many of them. The press releases work as a reality check – I often start with a press release and then go through the SPM.' M2

'I work from the SPMs but we have this crazy situation that except in the case of WG2, the SPM and the underlying reports are not released at the same time.' M3

'I work mostly from the SPMs, but they are not what they say they are on the tin.' M4

'We now do a wide variety of coverage, so we use different pieces of information at different times of the day. We had a live blog, which is much more a sort of news wire type process. Then later, by the time we've done the scene-setter piece, the immediate piece, and the reaction, now what we're talking about mid-afternoon is the definitive piece that's going to go in tomorrow's paper. This is when you stand back and say what the most important thing is? And you

write it like that. We decided that the angle that we would take for that was the carbon budget. This whole idea was not a new one that came out with the IPCC, but the IPCC gave it a kind of imprimatur.

I thought the IPCC communication was fine for the process I was working with. We do a sort of précis of the SPM - You're picking out the top lines, titbits, for your readers. The process is that you pick out interesting titbits throughout the day, and then you save one big one for the end.

'I would work mostly from the SPM. But I would also definitely look at a press release, for several reasons. One is, it's simple and I want to see what it says. Another is that other media outlets will just write from the press release. Another reason is that the press release will go out somewhere, and go on a wire or whatever, and so the news editors back home will see some version of the press release, and they'll be on the phone going, "What is this? I see the top line is such-and-such," and you need an answer to that.' M5

4.2 The clarity of language/intelligibility

'It is possible to turn these reports into a language that most people will understand without harming the science. That's my job but the way the reports are written does make my job harder.

For example, I wrote a piece like a 'listicle' called 'UN panel: eight reasons to worry about global warming' which was based on what the IPCC bureaucratically calls RFCs (Reasons for Concern). So it shows it is possible to do it. Some scientists did not like it, but in general I receive very complaints from them about the way I interpret the science and use more accessibly language.' M1

'What they've done recently is to highlight their main findings and use bold text, which is a good change from what they had in 2007. On the other hand, they're still using words like 'anthropogenic' and 'mitigation'. The US national climate assessment doesn't use words like anthropogenic as far as I could tell.

The way that they're written still requires more than what your average policymaker, certainly what your average journalist, can understand.

It's quite difficult to quote even some of these headline findings as they are too long.

There might have to be an easier way of phrasing it to make it into a sentence that you could put into a newspaper or read out to somebody.' M2

'The language they use is publically indigestible. But it's my job to turn it something my readers can understand. I have never had a complaint from a scientist or policy maker for the way I have made the language more understandable or the way I have explained the science in a certain way.

The Risky Business Report and the US National Climate Assessment Report are good example of how to do comms well and use accessible language. They draw you in.' M3

'The intelligibility of the SPMs in 2013/4 was worse than those in 2007. This is partly because of the disparate nature of the different groups of scientists working on them. WG1 was slightly easier, but WG2 and WG3 were very difficult to understand.

It may be worthwhile for IPCC scientists to keep asking the question how they can make sense of their reports for the general public, for example their family members or school students.

'Even the word 'model' is difficult – maybe 'computer projections' would be better. Confidence and likelihood levels are also difficult. We use phrases like 'scientists are very or pretty sure that....' M4

'The language that the IPCC uses, you re-formulate quite a lot, depending on your readers. Something that's quite significant, but would probably get overlooked, is that the <WG1> release happened on a Friday. Saturday readerships

are completely different than weekday readerships. At the FT, it was especially striking. You had a business readership, but the FT is a completely different newspaper on a Saturday.

Even at *The Guardian*, the weekend readership is, for print, much bigger. They want a slightly different type of story. It's a bit more of a leisurely read. They've got more time to digest things. You can be a little bit more discursive. It's all a little bit more human interest as well. It's a different feel to the story. It's a different tempo. It's a different way of talking to the reader.' M5

4.3 The IPCC graphics

'The graphs and the diagrams in the SPMs could be a lot simpler. They're really overloaded with the information sometimes. Some of those ones are really great once you get the hang of what they're about. But sometime you have to read half a page of text to understand what it is about.

My graphics colleagues do use some of the IPCC graphics straight like the pictures of temperatures warming up the planet. Those are good ones, but often they don't use the other ones. The Burning Embers one in WG2 where you've got those fingers of temperatures rising is useful.' M2

'There's too much going on in most of the IPCC graphics – we don't use them as the visuals are shocking. There is not enough time between the release of the reports and air team to do our own, so it would be helpful to have some material under embargo as Science and Nature magazines do – even a day would help.' M4

4.4 The use of specialist writers

'The IPCC needs to look at the way the US Climate Assessment Report was written in clear language. They brought in a specialist science writer (Susan Hassel) early into the process. It would make sense for the IPCC to do something similar, even though I lose an advantage if they employ writers, as it's my job!' M1

'You run into all sorts of problems <with bringing in specialist writers>. People will ask 'is that a redaction of the SPM, or interpretation of the SPM? Is that going to be approved by all scientists? If it's not, then you will get sceptics who say, "Look, this is not official. This is spin. This has not been approved by all the scientists." You will inevitably get some scientists who have been in that room who say, "I don't agree with this interpretation".

'I think if they're going to do that, they should probably do that from the Synthesis report. You can say "Look, we were already synthesizing these reports so that they're more digestible for policy makers. Now, we're going to synthesize the synthesis," and do a sort of version that is just easier for policy makers to understand.

'You have to anticipate that everything the IPCC does has to take into account what happened with 'Climate-gate', and has to anticipate the repercussions that flow from it. You can't do anything that can be attacked as polishing or interpreting or spinning or tidying up.

The SPM that's agreed on by all the scientists has to be sort of sacrosanct. If you're going to do some other things around that, then you need to be clear that it's in some way outside the process, exactly what the methodology is, and who is doing it and who says what and who it's been OK'd by'. M5

4.5 Recommendations

Transparency
'The IPCC is not transparent and this does not help their relationship with the media and their strategy. Going back to 2007 AR4, the sessions are closed to the public and that is not the way to counter the conspiracy theorists. I had to stand outside the sessions and talk to the scientists. We need to show the open and frank discussions that go on.' M1

'The lack of transparency in the IPCC sessions is wrong – why not make them public?' M3

'Keep the chapters in the WG reports the way they are, and make the SPM more readable. The technical summaries could be the ones aimed at scientists, and the SPMs the ones for ordinary people and policy makers.' M1

Drafts:
'The drafts are always an issue for us because we're trying to get hold of these drafts along the way as journalists. These are, of course, quite difficult to get hold of because they're held very closely. The final draft of WG2 was leaked on a sceptics' website. That means us having to quote someone else as the source of this leak, which I think is embarrassing for the IPCC.

It would be helpful for them to be able to control this a bit better by making these documents publicly available right from the very start. Ideally the best thing would be that as each draft comes out, just stick them on the website and make them publicly available. If it's a work in progress, say what draft it is, with a clear statement not to think this is a final product.' M2

'We don't want it to be sound bites, but we do want solid science that is well-written.'

'It would be helpful to have one or two clear headline statements for each of the WG reports.'

'Sundays: having shorter bulletins and few of the usual discussion programmes means there's even less room than normal for explanation, context or qualification. I'd bet that any broadcaster interested in the subject would vote for a weekday release.' M4

What's new in comparison to AR4
'It would have been helpful to summarise what was new compared to AR4. The issues around increasing certainty, ranges of temperature increases by 2100, and sea level rise - it would be nice to have that clearly.

For someone like me, I know and my sources will tell me. But it does make sense for the average reader. Here's what it was, and here's what it is now – that would help. They could present it in a chart.' M1

'One thing I don't like is the way that they never really make any reference in their text back to what their findings were before. They need to say that "We expect sea level rise to be this much now and, by the way, that's less or more than we expected, or it's a narrower range or a wider range." At one time in 2007, they looked at GDP losses, in terms of working how much it would cost. This time around, they talked about losses in consumption.

For example, sea level rise this time around was expressed as 26 to 82 centimetres in the period 2081 to 2100 relative to 1986 to 2005. That always strikes me as a very strange way of putting it because in the last decades of the century that they're referring to, average sea levels would be rising fastest if they do accelerate. They do at some point tell you what that will be over this century. Why not just put it as this century?

It's similar with all the temperature projections. Of course models change over a few years, and you can't just stick to the same models. You've got RCPs, representative concentration pathways, which are very different from the scenarios that were laid out in the AR4. <But> everything changes so much each time. It's very difficult to keep track. It would be nice to have some sort of reference inside the text to say what's different and how it's different or just simply why these are apples and pears now.' M2

'There is not enough focus on what is new for journalists compared to the previous reports'. M3

'It would be helpful to have a summary of how the science has changed since the AR4, and how the levels of uncertainty have changed too.' M4

'You go through the SPM line by line, and you're trying to see whether there are any numbers that are different from in the drafts. And compared to 2007, you're looking for differences, what has changed, because something changing is always a story, and staying the same is not. It would be quite helpful to point out more what were the significant changes.

They sometimes do provide a kind of comparator with previous assessment reports. They'll put it kind of in brackets in the text, or whatever, or they'll kind of mention it, whatever. I don't think they do that completely consistently, but they do it with some of the big numbers. I suspect they did it with 95% certainty, up from 90%. I'm pretty sure they did that.' M5

Other reports

'There are some good models for communication in the release of other reports such as the US Climate Assessment report. But the IPCC reports have to go through bureaucratic UN procedures which make them more difficult to communicate effectively'. M1 and M3

4.6 Other Issues

Organisation and responsiveness of communication team

'The comms team was a lot better this time around. Jonathan Lynn was a lot more helpful than previous planners. He'd come around with people like Jan Pascale. They travel around and explain things to journalists well in advance. The speed of response to inquiries was much better too. In general, the experience of 2013-14 was qualitatively very much better than 2007, in terms of logistics and accessibility. Also, one of the co-chairs was willing to talk about a leak on the record, which was a complete change from a few years ago when, if you got in touch about a leak, the scientist would still be unwilling to talk. You'd then have to seek comments from outsiders, such as climate experts at Greenpeace, the WWF or other NGOs.' M2

'The press conferences are hardly usable for normal broadcasters, but the availability of IPCC authors afterwards was very helpful' M4

'It was better organized, in the sense that the venue was very well organized. The preparation was very good, in that we all knew the drill. We'd been told the format of what would happen, and when we'd get the various papers and so on.

In terms of logistics it was better, knowing about getting in, having a press room, having the conference hall where everyone could sit and hear and talk, and there was room for everyone. There wasn't just one plug socket between 59 people. All of that went very smoothly, and then afterwards, there were opportunities to interview people and so on.' M5

Resources/working with NGOs for comms work

'This time the IPCC was more media friendly. They used some public communicators like the woman working with the UN Foundation – this really helped.' M1

'The NGOs working with the IPCC comms team were very helpful'. M2

'The work of the IPCC comms team was much better in terms of mechanics this time round but they still do not have enough resources' M3

'It's fine to have 'enablers' working with the IPCC, but not 'spinners'. It is our job to work with the IPCC findings and present them to our audiences.' M4

'For the size of what they do, and for a hugely important international organization, the IPCC has essentially got one person and an assistant. That's tiny, that's nothing. But for most of the year, for most of 4 years at a time, that's probably all they need. Jonathan <Lynn> and whoever else needs to turn up at the COPs and a few other meetings a year. They probably have to field a sort of steady stream of questions throughout the year. Why would you need a big media operation the whole time? I could totally see that. I can also see that if you are offered outside help from someone, then you might want to accept that help. But the IPCC is always going to be under attack. You've got to give the attackers as little ammunition as possible, and if you are seen to be allowing your press operations to be taken over by people or NGOs who have a vested interest in climate change, that could give ammunition to those attackers.' M5

The lay-out of reports

'I would change the entire introduction to the IPCC reports. You get this huge amount of credits at the beginning of the report - You have two pages or so with just names of all the authors. In the Synthesis report, the summary for policymakers, it's got two pages of names. There's a page of dedication to Steve Schneider, which is great, but it could've been at the end. It makes it rather imposing. You feel this is something for scientists, and not for normal people. It takes too long to get into messages of the report. Why not put the credits at the end?' M2

'Why do the SPMs have to reflect the chapter breakdown of the full reports? Why not just organise it by themes along the lines of 'this is what we have say about Arctic sea ice melt, this is what we have to say about oceans etc.'? M4

The 'Pause'

'The IPCC did not do a good job on the 'pause'. They needed more on it, perhaps a box; there is disagreement what causes it and how to handle - but don't downplay it'. M3

'They were slow to address the pause – they need to be more sensitive to what is being said in the wider world'. M4

Risk

'WG2 should take credit for categorising the challenge as one of risk. I did a whole story on that, and I think it can help.' M1

5. Interviewee Coding

Seth Borenstein, Science writer, Associated Press - M1

Alister Doyle, environment correspondent, Reuters – M2

Justin Gillis, New York Times - M3

David Shukman, BBC science editor – M4

Fiona Harvey, environment correspondent, the Guardian – M5

4.4 The NGO Sector

1. Main Points

- The IPCC reports are absolutely central to the work of all the NGOs interviewed. They give a solid, trusted and authoritative scientific foundation for making the case for climate action.
- In the USA, they were seen as playing a pivotal role in establishing the credibility of the science.
- All of the NGOs did a lot of work around the release of the reports. Most of them produced their own material and briefings based on the reports, working mostly from the SPMs.
- The reports were seen to be written in a language not very accessible to the non-expert.
- The IPCC's work with the media was considered to be generally successful, with gaps in coverage in some countries.

2. Recommendations

- The IPCC science needs to be broken down to an accessible level that engages non-expert audiences, and further break it down to a regional, national and local level where it becomes relevant for these target audiences.
- There is a need for plainer, more digestible language in the SPMs which a non-expert audience can understand more easily. The exec summary (overview) of the 2014 US National Climate Assessment is seen as a model for clarity of language.
- A two-page summary, which was produced for WG1, could also be produced for the other reports at the time of the press conferences.
- The IPCC communications staff team needs to be given more resources and people.
- The IPCC should produce more, timely breakout reports in between the blockbuster AR reports which come out every five to six years.
- The IPCC should think clearly and urgently about how to work best with communication specialists, how to direct them, and when to bring them into the writing process.
- One strong suggestion is to bring them in early in the process, and look at the way they were brought into the production of the US National Climate Assessment of 2014.
- A detailed digital strategy needs to be developed to respond to the rapidly changing media world.
- IPCC authors and representatives should be available to engage more with social media, and receive training to that end. A published calendar of interactive events should cover a wide range of specialisms and areas within climate science.
- The timing and location of the press conferences need to be carefully chosen with more consideration for their suitability for media coverage and wider communications work.
- Careful thought needs to be given to the communication of scientific uncertainties. One suggestion is to start with what is known, rather than the uncertainties.

3. The importance of the NGO sector

One of the main ways the IPCC reports are disseminated to policy makers and the wider public is via the many NGOs who are active on climate change or related issues. They vary greatly in their aims and methods of working, but most are heavily involved in advocacy, campaigning and education. Several of them concentrate on working through and with the media, so there is an inevitable overlap with the findings found in section 4.3 of this report. All five NGOs selected for interviews used the IPCC AR5 reports extensively in their work.

Climate Nexus is one of the largest NGOs working on climate change from its base in the USA. It describes itself as 'a strategic communications group dedicated to highlighting the wide-ranging impacts of climate change and clean energy

solutions in the United States'. It works particularly with the media, other relevant NGOs and thought leaders. Many of its staff have a background in communications and media. It worked closely with the IPCC communications team in publicising the AR5 reports.

The Global Call for Climate Action (GCCA) is a diverse network of more than 450 non-profit organizations in more than 70 countries with a shared goal of aiming to keep the world safe from runaway climate change. It says it 'harnesses the strengths of faith, development, science, environment, youth, labour, and other civil society organisations to mobilise citizens and galvanise public opinion in support of urgent climate action.' Amongst its many partners are 350.org, Greenpeace, CARE, Christian Aid, Tearfund, WWF, Save the Children and Oxfam.

The Science Media Centre is a London-based, independent press office which aims to ensure that the public have access to the best scientific evidence and expertise through the news media when scientific issues are in the news. In particular, they work with journalists to provide them with information about science and its related disciplines, and with scientists, engineers and other experts in supporting them to engage with the media. They have produced several briefings on climate change in recent years, which is one of their priority areas.

Avaaz uses internet-based campaigning methods to take action on a number of global, national and regional issues, including climate change. Avaaz means 'voice' in several European, Middle Eastern and Asian languages. Launched in 2007 it now says it has more than 40 million members. It says that its 'model of internet organising allows thousands of individual efforts, however small, to be rapidly combined into a powerful collective force'. It was one of the main organisers behind the September 2014 climate marches.

WWF is one of the largest international NGOs working on environmental issues. It says its 'ultimate goal has always been "people living in harmony with nature" - so we're about respecting and valuing the natural world and finding ways to share the Earth's resources fairly'. It works extensively with communities, politicians and businesses to achieve its core aims, one of which is to reduce carbon emissions, shift energy policy and press for strong climate targets. It has official observer status at the IPCC plenary sessions.

4. Relevant Quotes by Topic

4.1 The importance of IPCC reports

'The IPCC AR5 report was absolutely central to the tectonic shift we are seeing in the United States and elsewhere around climate science. It was absolutely pivotal and it had to do with the scientists' efforts, the communicators' efforts, and the policy makers' efforts. It was central to our strategy to help turn the tide in the United States through the media. The big picture is that it was a huge success. You can actually see it all across the United States, <...> the debate about the science is nearly over now, and it's mostly because of the roll out of the IPCC reports over the course of six months.' NGO1

'The IPCC reports are very useful in that they

- create awareness and attention for climate change and the most important threats and opportunities (at a time when the issue is struggling to get the attention it deserves)
- give a solid and authoritative scientific foundation for making the case for climate action (moral, social, economic, and environmental)
- give additional leverage to hold governments accountable in our efforts to speed up the ongoing transition from fossils to renewables (as governments negotiate and endorse the summaries).' NGO2

4.2 The usage of the reports

'We produced our own material based on each of the reports. We highlighted the main findings, backed up by quotes from each of the reports.' NGO1

'We used the IPCC reports and turned them into a) a resource pack for our NGO network that broke down the findings, simplified them, and added public messaging later (WG1, WG2, WG3, SYR); b) a regional breakdown of the science to

make the findings locally/nationally/regionally relevant for audiences (WG1, WG2, SYR); c) story telling - putting a face, name, story on the abstract science, to make it local, real, relevant, accessible, and engaging (WG2, WG3, SYR); We also used Facebook memes based on the story telling materials to make them shareable on social media platforms.' NGO2

'We did a lot of work around the release of the three WG reports, but not so much the Synthesis Report. We did the least on WG3 – in fact, it felt to me that each time there was a new working group I halved the amount I did.

For WG1, we did whatever was most useful for UK journalists, particularly the ones who couldn't be over in Stockholm. We had a panel of scientists about half of whom were IPCC contributors and the others were experts in their fields. They came here and watched the press conference, which we streamed from the host city to journalists here. Then the scientists took part in a Q&A with the journalists once that press conference had finished.

For WG2, we did a background briefing on UK climate impacts which was about the same topics which the IPCC would be reporting on and included some IPCC WG2 authors. This was before the IPCC launch but it wasn't an attempt to pre-empt them. It was to educate journalists who would be reporting on it with a focus on UK climate impacts. It was a splicing together of the main chapters in WG2 that would be of interest and addressed the questions that journalists wanted answers to, e.g. food production, flooding, and rainfall. We also held a press briefing before the release of the WG2 with the same focus. For WG3, we didn't do a briefing. I did a roundup of quotes.

You should ask the journalists how useful and clear the IPCC material was. We did not really use their material but we did rely on their timings to do work around the reports.' NGO3

'It can be really hard to sift through the reports and work out what you can grab or you can't grab <for campaigning purposes>. So if there's a geographical orientation, or a content area like a specific commodity or a territory, say oceans, which is easier to pick up and go with, that really helps. If they could present a closer relationship between the cause <of climate change> and the effect, that would be great. I feel like the coffee story that came in the <WG2>report was great - the Guardian led with it, and I thought it was super.'

'We read the exec summary which was good and it was helpful. Some good stats in there we could pull out and they pulled the top lines out very well. So they crunch the information well and the exec summary <SPM> was useful. But to be really honest with you, we would take our lead from the media and how they presented it and use that as our North Star. We did not look much at their other materials like the videos and other material they produced.' NGO4

'The reports themselves - and their SPM graphics, headline statements, etc. - were not particularly usable for our audiences. They were very useful for internal presentations to staff on key findings, but far too dense and technical to use with "lay" audiences. There was a lot of confusion about the IPCC's expressions of confidence. We also found ourselves having to produce internal documents/materials to explain key new findings or terms, such as BECCS, because the reports themselves did not explain them in a clear or succinct way. The videos that the IPCC produced for each working group and SYR were nicely done visually, but far too long and wonky to promote on social media, etc.' NGO5

4.3 Language and clarity of the reports

'The way we've established a relationship with the media is that we use clear, plain language. For the media and for policy makers and staff and thought leaders, we draw largely from the SPMs but we dive very deeply into the science itself to buttress the main point. Every single major message is supported by going as deep as we can go into the science. It's not easy but it's what we do. Then we come back out from it and try to make it all perfectly readable and understandable.'

We work from the basis of the SPMs, backed up by some of the science in the WG reports. It's easier for us to work from them and turn them into clear, plain language, as at Climate Nexus we're a whole bunch of senior communications pros and ex national media. We're all trained in doing that so it's not hard for us, and that's actually the reason why Climate Nexus was created in the first place by 7 foundations (which includes the Rockefeller Brothers Fund).' NGO1

'They are scientifically strong, but challenging for public communications. There is a need to break IPCC science down to an accessible level that engages non-expert audiences, further break it down to a regional, national and local level where it becomes relevant for audiences, and also package it in story formats that put a face and a voice on it so that it becomes real for people and resonates with them.'NGO2

'The exhaustion of the IPCC speakers probably colours the clarity of the messaging at least as much as anything else. You remember the press conference where they had literally been up all night. The chair of WG1 hadn't slept in two days or something. I think it lent it a sense of drama but it probably took away some clarity.' NGO3

'The reports could be a lot better in terms of ease of language, and you have to translate a lot. And they're talking to themselves often with the language that scientists use rather than talking to the wider community. Science doesn't have to be scientific in the way that it communicates. There are different ways of boiling it down to its essence. These are areas to improve on. But I also have an acceptance of the role that the IPCC plays in producing such an authoritative work of science.' NGO4

4.4 Working with the media

General:
'The IPCC communications team were better this time than the time before. Last time they really didn't have a comms team and it was quite clear, at least by this time around, that they needed one. What we were pleased with about that is that Jonathan <Lynn> was willing to come to us and meet journalists. There was more of an exchange and flow of information between the IPCC and the UK media than there had been in the past.'

'They've kept me informed about the stuff when I've needed to know it. It's been easy to get information out of them about things like embargoes and key findings.'

'I wish that the timing of the conference was a bit better geared to the media. What I would really like them to change is the fact that they end things on a Friday night. It doesn't really help anybody, even when it rolls over to Saturday morning. It's still absolutely the most useless time. It would be better if they went from Wednesday to Wednesday or something like that so the global media <can report it more widely>. That is one thing they really could change as the media reception of their work is as important as anything else.' NGO3

'I think the choice of location to host the press conferences was just crazy because when they do not take place in an international media hub, it is very hard to deliver for broadcast media. I'd either go exotic in a location that has a clear climate orientation or go to a major media hub like London, Paris, or New York.'

'We look at the IPCC reports in terms of whether they hit enough front pages around the world. And they did. My top line thought is that these reports are being launched well; they're being well received, in some places they've got the coverage they deserve and some places they simply didn't. They've got to go and look at those gaps and how they can fill them. But given the tension that surrounds these reports, they did pretty well.' NGO4

Social media:
Availability: the IPCC must be available online 24/7 to respond to queries and rebut misinformation. Practically, this could be achieved by developing a rota of IPCC co-chairs and lead authors who take charge of particular social media channels for short periods of time.

Training: IPCC representatives must receive social media training. Scientists are not trained communicators, and social media is a different beast from (the perhaps more familiar) legacy media. Nonetheless, some scientists and scientific organizations have proved themselves effective social media communicators, and this expertise is valuable to the scientific community as a whole. As well as training, scientists must receive support from their home institutions in undertaking these essential scientific responsibilities.

Engagement: IPCC representatives must actively engage in dialogue through Web 2.0 channels. It is not enough to publish IPCC reports online and then sit back and expect the wider world to read them in their entirety. A fully engaged

and active IPCC Communications Strategy would see the IPCC scheduling regular interactive sessions on online platforms such as Google Hangouts, Reddit AMAs (ask me anything) and even its own website in which co-chairs and lead authors are available to field queries. A published calendar of such events could cover a wide range of specialisms and areas within climate science. These events should happen throughout the IPCC cycle, not just when a report is released. NGO5 (adapted from NCC article)

Digital media:

'The media world has radically changed. Digital media, whether anybody likes it or not, is here to stay and anybody who doesn't recognize that isn't recognizing reality. The Guardian has seen its print readership shrink, whereas their digital imprint is huge. In fact its environmental coverage in digital form is the most widely read in the United States - more so than the New York Times and anybody else - because they've got a digital strategy that has worked on a global basis. Everybody who deals in the communication space understands that you must have a digital strategy that includes social media and non-traditional digital media, including blogs that are widely read and opinion pieces that are based in fact and science, and then the traditional media. Digital media is here to stay and drives lots and lots of conversations. You absolutely cannot ignore it.' NGO1

4.5 Working with specialist writers

'I would strongly encourage the leadership of the IPCC to trust their communications teams - trust that they are ultra-professional and know what they're doing. Do not simply think that keeping drafts from the communications professionals is somehow something you need to do, that you need to limit it just to the scientists. Actually, it's the reverse. The communications professionals are the ones who can help to head off potential problems long before they show up in final drafts.

There needs to be an iterative process between the communications professionals and policy professionals and scientists. That is healthy and good. I've been in big jobs at the National Science Foundation and the FDA and the White House and at every instance I've fought for the communications teams to be at the table while things are being discussed. It's always better and never hurtful.

The best communications professionals of the world have no interest in trying to co-op the science or corrupt it or change it and yet there is sometimes a feeling among scientists that that does happen. It actually doesn't happen.'

'Whenever possible, have pros translate complicated things. In this case, some professionals were available like the Climate Nexus staff, and we were able to help translate. We did massive background documents that were made widely available that helped explain WG1, WG2 and WG3 and then collaborated with other groups on a global basis. That outside help's not always going to be there so the IPCC should have access to those resources and should be able to direct those resources.'

'The perfect prototype <of a specialist writer> is Sue Hassol <who worked on the National Climate Assessment in the United States>. One of the reasons why the Assessment was hugely successful is that Sue is a professional communicator - she's trained scientists to talk all of her professional life. She was actually hired on contract to help draft the executive summary of the Assessment for the administration. The executive summary was so elegant. It was just brilliant. You want to have people like Sue involved sooner rather than later, no question.' NGO1

4.6 Recommendations

More resources for the IPCC Secretariat communications team

'The IPCC communication effort is woefully underfunded. Jonathan (Lynn) could have absolutely used more resources. They deserve more support institutionally. Private foundations and outside groups like ours came in to help their work – but it is a volunteer process and entirely too cumbersome. <..> Because it's volunteer and there are many, many players, it just makes it really hard to corral and collaborate across all those volunteers.' NGO1

More breakout reports:

'The special report on extreme weather and climate change, that pre-dated the IPCC AR5, was immensely helpful. We did a massive media roll out around that in the United States and it was really helpful as a scene setter for the AR5. <..> We would advocate the IPCC should do more of that, even if they're going to continue with their every five or six year structure. Somebody needs to come up with the resources to do timely breakout reports.' NGO1

Better communication of uncertainty

'One of the biggest problems with the IPCC and the reports – and it's endemic to the entire science community, not necessarily the IPCC – comes as a result of the nature of the science process, which looks to answer questions about what we don't know. All major science reports always lead with an entire narrative about what we don't know, endless discussion about what we don't know, and what we're uncertain about. Often that's what gets reported to the media and lay persons - which is that there are uncertainties, we don't know things

That is actually the exact opposite of what public communication is all about. Public communication is about what we do know, what we're confident in. That's the clash always between communicators and science and you see it big time in the IPCC process. It's just something that people need to recognize. The way you get around it is to skip to the conclusions, to what we do know and then we ask the scientists to go as far as they can in supporting that. We recognise where uncertainties remain and where they can't and that too needs to be communicated. But the communicators invert the process and start with what we do know and work backwards and then you come to the best resolution.' NGO1

More story telling

'They cannot have an advocacy message, but they can be human beings – without losing their credibility or their legitimacy. They can be fathers or grandfathers or mothers and grandmothers, and they can explain what the science means for their children and grandchildren. People watching an IPCC scientist on the BBC may respect the expert who explains the science to them, but they will connect and sympathize with the parent who is worried about their kids, because suddenly they can see themselves in this person and identify with the scientists.' NGO2

Targeting Audiences

'Effective communication requires a clear understanding of who is your audience, and what drives these audiences, e.g. personal values, political dynamics, or career issues. You need to know your audience through literature or testing, in order to produce communications output that is tailored to meet the needs of these audiences which they can engage with. The IPCC needs to put its communications output into formats that are useful for the respective target audiences, e.g. heavy on text or strong on visuals, long/complex or short/simple, and shareable/actionable or not. It needs to fill these formats with language that is appropriate for the respective audiences, e.g. using frames that appeal to helpful values and using accessible and engaging language.'NGO2

5. List of interviewees

NGO1 Jeff Nesbit, Climate Nexus

NGO2 Christian Teriete, the Global Call for Climate Action (GCCA)

NGO3 Tom Sheldon, Science Media Centre

NGO4 Sam Barratt, Avaaz

NGO5 Leo Hickman, WWF ((at the time of interview)

4.5 Higher Education Sector

1. Main Findings

- The IPCC reports are seen as comprehensive and authoritative.
- The full WG reports and the SPMs are both widely used by the interviewees in teaching climate science and its policy implications.
- They are either distributed or used in the form they are published or adapted to be more user-friendly for the students.
- The IPCC materials are often used successfully in conjunction with other reports on climate change.
- There are differing views on how much the students understand the language of the IPCC reports and SPMs, which is often closely related to the academic discipline they are from or most conversant with.
- There are also differing views on how useable the IPCC graphics are: some find them too cluttered or unclear, others find them easy to adapt.
- Interviewees could appreciate the advantages and disadvantages of having specialist writers working with the scientists.

2. Recommendations

- As there is a general recognition that the IPCC reports are not designed as a text book for students, and as most of the interviewees use the IPCC report alongside other reports, there is little demand for a specific IPCC product aimed at the education sector.
- However, there was some desire for a 'second stage' whereby expert writers adapt the material for specific student sectors.
- Some of the key concepts, such as a 'climate model' or 'earth systems model', 'radiative forcing', 'adaptive capacity', need to be explained more.
- The language is difficult for students or lecturers not familiar with the particular academic discipline behind each of the WG reports – it needs to be simplified in some way.
- Several said it would have been more useful to run the findings of WG1, WG2 and WG3 together and not publish them separately with a large time gap.

3. The higher education sector

The interviewees came from four UK universities (Exeter, Imperial College, LSE and Oxford), and from different academic disciplines. They teach students on a wide variety of courses with different backgrounds and exposure to climate science. Four of them taught undergraduate courses, and one helped to devise online courses for professional and interested parties. The responses to the interview questions were largely driven by this variety of disciplines, expertise and students. As a result, there were a large number of differing points and recommendations.

The interviewees were chosen because they used the IPCC reports extensively in their teaching. Their range of experience, backgrounds and student base can be seen from the following list:

Simon Dietz has been Co-Director of the Grantham Research Institute on Climate Change and the Environment Since March 2011. He is also Director of the Centre for Climate Change Economics and Policy and Associate Professor at the Department of Geography and Environment at the LSE. His research interests included decision-making under uncertainty, questions of equity/social justice within and between generations, the links between economic growth and the environment, and international environmental agreements. He teaches an MSc course on climate change, science, economics, and policy.

Lina Mercado is a lecturer in Physical Geography at Exeter University. She is a vegetation modeler, focusing on improving representation of plant physiological processes within earth system models in order to improve predictions of present and future land surface -climate interactions. She teaches a third year module named climate change and its impacts, as part of the Physical Geography programme.

Duncan Russel is an associate professor in environmental policy at Exeter University. His research and teaching interests include UK and European Environmental Policy, amongst others. He engages with policy makers in a number of ways, including providing written and oral evidence for parliamentary committees as an expert witness. He teaches two modules for third-year undergraduate politics students, called The Politics of Climate Change, and The Politics, Policy and Practice of Sustainable Development.

Dunia Urrego has been a lecturer in Physical Geography at Exeter University since September 2013. She studies past environmental changes in the tropical and subtropical regions, with a focus on pollen and charcoal records from lake and marine sedimentary sequences to reconstruct environmental change over orbital and millennial timescales. She teaches two first year undergraduate modules - Study Skills, and Research Methods in Geography; contributes to the dissertation module for second and third year students; and convenes a third year module on tropical paleoecology and paleoclimatology.

Erik Van Sebille is an oceanographer at The Grantham Institute of Imperial College, but until recently taught at the University of New South Wales in Sydney, Australia. He was a guest lecturer on the science of climate change at the UCL Business School in Adelaide which ran a Master's degree in Resource Management which included a module on climate change. The students mostly had a background in business. At Imperial College he is developing a class, The Science behind Climate Change, for the business school.

Peter Walton is a Knowledge Exchange fellow at the Environmental Change Institute at Oxford University. He is responsible for developing and supporting knowledge exchange opportunities with external stakeholders on behalf of the Oxford Climate Research Network. Much of his work is communicating the practical implications of climate change impacts to a wide range of audiences. He has helped to develop a range of learning (and e-learning) resources. He inherited the site Climate*education*.net, which is a global online education programme aimed at encouraging the sharing of high quality information about climate science and modelling. Its target audience is professionals and interested parties.

4. Relevant Quotes

4.1 The Usage of the IPCC reports

'I teach a postgraduate course on climate change, science, economics, and policy, and the IPCC Assessment Reports are always a key resource for that teaching. The students can come from a wide range of backgrounds so they generally don't know a lot about climate change beforehand.

The way we would do it, in teaching at least, is that we would quite often have the students read the SPM as a key pre-reading for a lecture or a core reading to come to an accompanying lecture. They would be directed to the technical summary for further optional or core reading. Very occasionally they might be directed to a specific chapter within the reports. We do not use the FAQs or other material.'

'We generally give it to them in the form that the IPCC publishes it.' ES1

'We have used the IPCC report since the autumn of 2011 when we started teaching a third-year module named climate change and its impacts. We updated the course last year when the AR5 WG1 report was released.

The FAQ, the maps and the boxes with extra info were very useful as reading material for the students, as we have an assessed piece of work that needs using IPCC material for different regions. We mostly use WGI and WGII.

We produce our own lecture slides, and sometimes use figures from the individual papers and sometimes any useful illustrations from FAQ or SPM.' ES2

'I tend to use the IPCC WG1 chapters more as background information as to why it is important to understand past climate change; trying to put the projections for the next hundred years in context with the paleoclimate archives. How does that compare to the past four hundred thousand years in terms of atmospheric CO2 temperatures? How does that the <hockey>stick line compare to the same graph if you go back several hundred thousands of years?' ES3

'We have to teach the module in quite small groups of about 30, and it's mostly discursive based where I send them to do specific exercises with a bit of lecture input from me. The IPCC reports come into that quite a lot, because we do climate change negotiation simulation. One group is the IPCC, who have to use the reports to devise their position in the negotiations. In other seminars they also have to go through the reports and for example, devise adaptation strategies based on the information.' ES4

'What I did was essentially go through the WG1 SPM with the students. "What does the science say?", "What do we know?", "Where are we going to?" and "What are the expectations?" I tried following the IPCC SPMs for most of it except for that I was missing a lot of background on what a climate model is. I needed to come up with my own material explaining this. It's hard to convey the message if you don't really understand what a climate model or an earth system model really is.

For WG1 the SPM worked well for my student cohort, who were business students. I didn't think I could expect them to be too critical of the pure science because they would just have no idea where it's coming from. What I did then with the business students was to get them to read the WG3 SPM for themselves, in groups, and discuss that much more.

The Ten Key Points or so – they were really nice, very short sentences which are very powerful.' ES5

'We had to update our material for the online site on the basis of the AR5 reports. We include a lot of material included on regional modelling, but it was a tortuous process to update the material on the site on the basis of the AR5 reports.

'In general, the AR5 reports are far too big for use in the education sector. In their current form, they cannot be structured for easy use by the education sector – it's probably not appropriate or possible.' ES6

4.2 The language and clarity of the reports

'The main reason for using the IPCC reports is that they are comprehensive and authoritative. It is not the easiest read. And it's not written like a textbook for students. That's not its purpose.

'Likelihood and confidence is not the problem because of course you can cross-reference to the explanation of those terms. It's more where there isn't a formalised convention about the choice of words.'

'I get occasional appeals for help to penetrate the text and understand what's really going on to tell them where to focus their reading and where not to focus their reading because of course the reports are voluminous. But for the most part I think they get along with it.' ES1

'Parts of the report are difficult to read for students, but the FAQ and boxes with info are quite clear and very illustrative.

Some of main sentences in the SPMs are quite hard to follow. We had a lecture from one of the scientists that was present when the SPM was written, and that was his point, that some messages are clearly written by scientists and then once the SPM gets agreed, it gets changed and some of it gets confusing and it's not anymore in the hands of the scientist to get the text so clear.' ES2

'I would say that <the third year students> are pretty good at understanding what the WG1 report means. Even with the first years, who use some of the SPMs to do an exercise on critical reading, I get the feeling that they understand what is said.

With some of the students I need to do a bit of prompting. But I wouldn't say that's specific to the IPCC, to be honest. I think that's the case for the scientific literature in general.' ES3

'If you're talking in a business school like mine, myself as an oceanographer talking to economists, you really have to think very, very carefully about language that you use. That was why I liked the SPM so much <compared to the actual chapter reports> because that was much more the language that my students would be comfortable with.

'The biggest example <of a problem> is the use of the word "uncertain". Within my field of research, it is perfectly normal to talk about uncertainty as if we mean the things that we don't know, but I've been told over and over again that uncertainty in a policy framework or in a business framework means something quite different. Uncertainty means things that we don't really have to deal with because we don't know them, so uncertainty really has a negative connotation. What I understand about it and what I've used in my teaching is that it's much better to go with "risk" rather than "uncertainty".' ES5

4.3 The IPCC graphics

'I use the original graphs. I don't redraw them, but I do highlight things on the graph, using the PowerPoint tools, to guide the students to look here or there, because sometimes they do have a lot of information. There are some graphs that I do find quite crowded and difficult to read. You need to look at them quite a bit. Others are fine.' ES3

'I like some of the pictorials – they are simple things that you can relate to. You can't play with them but you can see them and they're there and they're quite clear and it gives you that symbolic idea of what's going on. I find some of the graphs and RCP type things are a little bit dull, and not necessarily easy to understand. I think the students struggle.' ES4

'I love the graphics. I think that students understood all the graphics. Of the slides I presented, at least 75% were just the graphics from the IPCC report. I did not find them too cluttered. They are sometimes a bit big on the number of subpanels. Some subpanels are more relevant than others. So they can be improved by thinking about not having eight, nine subpanels, which they sometimes have. The one about the carbon budget - it's a very, very good graphic. There's a lot of information in there but it's a strong message that comes out of the graphic.' ES5

'The graphics are not clear enough. For example, the material on Probabilistic Event Attribution (PEA) in chapter 10 of WG1 needed a lot of adapting to make it more accessible to a general audience. Standard undergraduates really struggle with the graphics of WG1, although WG2 was better.' ES6

4.4 The use of other reports

'We don't give them the IPCC reports as their only source. We would never recommend that that be the only thing they read. It usually has to be accompanied by something which is much more pedagogical, such as The Rough Guide to Climate Change.

From the point of view of an educator the IPCC reports are not perfect. But then we don't expect them to do the job as the textbook would do. For all of these areas there are textbook expositions anyway. And so it can sit nicely beside them.' ES1

'At the same time as we're using the IPCC material, we use other material on the physical science backgrounds to climate change. Often I will go to the original scientific papers that are cited in the IPCC or I would be familiar with certain authors that would produce similar or relevant information.' ES3

'We supplement the IPCC material with material from UKCIP, the IEA and DECC. I used some of the MET office tools for example. Some of the supplementary material I use is actually made by someone else's taking the IPCC material and making it more useful. I think there's a great tool on DECC where you can look at a clickable map and there are different symbols and it shows the stress on fisheries and other sectors. The way that my students work actually, they really like web-type interactivity.' ES4

'I used the NOAA State of the Climate report in addition to the IPCC reports. In Australia, the Bureau of Meteorology also had a State of the Climate report and I used that a lot, to make it a little bit more about Australia, to essentially

take the message home a little bit more. State of the Climate is good because it's more up to date and it's annual. The question of how would you teach this module in four years, it would probably be based mostly on NOAA's State of the Climate.' ES5

4.5 Recommendations

'We don't need something that is specifically aimed at our sector because there are other textbooks out there already, and the IPCC reports are just part of the offer that we give to our students.' ES1

'Parts of the main report are not so friendly for non-experts. I found it hard to follow areas of science that are not within my area of expertise, so for students it is even harder. So my suggestion would be to try to make it clearer, but I understand that sometimes it is not so easy.' ES2

'I would say the writing style has to be improved. They tend to use a lot of commas and lots of substantive clauses, and also caveats in the same sentence. That makes it difficult to read. The fact that it's a very large document doesn't help. I don't know how many policymakers take the time to read such a thing. Even the SPMs could be more concise.' ES3

'Going forward I'd say the communication aspect is the most important because the science is very conclusive on the problem and the nature of the impacts. There are big gaps and there always will be, but there's now a sense of urgency needed. Of course no matter how well you communicate you won't get to navigate the politics, but better communication will help you deal with some of these more political aspects.' ES4

'I have learned that to talk effectively you have to talk about impacts. They need to be more up-front, even for education. It is very difficult to convey a message if you only keep on talking about 0.85 degrees warming, or another two degrees warming, and if you do so by the numbers. If you talk about 80 centimetres of sea level rise, faces in the classroom really went blank. When I was doing it, the WG1 was already out but the WG2 wasn't, so I could only talk about AR4 impacts and not AR5. It was quite problematic. That happened not only in our classroom but also more in our media engagements that we did when WG1 came out. There wasn't anything really about what people cares about in the SPM. From a teaching point of view or a communication point of view it would make more sense to provide the whole package in one go, and to provide the public and the students with what these numbers actually mean, rather than having to wait a few months or a year.

'I would recommend that maybe even in the SPMs, they should have text boxes. They work quite well in the main full report. Text boxes are the place to actually explain something that's not absolutely critical to the flow of the message, which you need to know if you really want to understand it.' ES5

'You need a two-tier process in which in the first stage the WG reports are written and produced, and in the second stage, they could be adapted for use by different education sectors. For example, it should be possible to work from the reports and explain what the key concepts are that need more explanation. You also need to have an understanding of WG1, WG2 and WG3 at the same time to understand the 'So what?' question. Finally, the graphics need to be simplified for teaching purposes aimed at most sectors.' ES6

4.6 Other issues

On the different WG Reports:
'Some of the charts in WG1 are extremely good. And some of the basic evidence collection is useful. You've got all of the models, all of the results together. WG2 is most problematic from my point of view. It seems to spend the most time clarifying terms and the least time discussing the actual evidence. WG3 is very helpful and very clear on things like emission scenarios and mitigation costs. I teach extensively from chapter six when asked questions about mitigation costs and all sorts of aspects of that. I find it to be very clear and well presented.' ES1

'I have looked at some of the mitigation parts, and some of the more social parts. I find them very difficult to read. But that maybe because they are not of my area of expertise (the Physical Science).' ES3

On specialist writers:
'I can see pros and cons of bringing in professional writers. I've seen it happen before and it can be a difficult experience both for the people involved in producing them but also for the intellectual integrity of the final text. It seems to me to be risky as it gives these people potentially quite a lot of power.' ES1

'It would be good and helpful to have specialist writers or communicators early in the writing process. They can actually get what the scientists ask and the scientists can ask them so, "I'm going to use this term - are you happy with that?"' ES4

5. Interviewee coding

Simon Dietz, Co-Director, Grantham Institute, LSE - ES1

Dunia Urrego, Lecturer in Physical Geography, Exeter University – ES2

Lina Mercado, Lecturer in Physical Geography, Exeter University – ES3

Duncan Russel, Associate Professor in Environmental Policy, Exeter University – ES4

Erik Van Sebille, Grantham Institute, Imperial College – taped interview – ES5

Peter Walton, Knowledge Exchange Research Fellow, Environmental Change Institute, Oxford University – ES6

5. Conclusions

What follows is an attempt to give a fair summary of the main findings and recommendations from the huge volume of material collected during the 30 interviews laid out in Chapter 4. Although there are many different views expressed in the different sections both within each sector and between them, some broad themes are common to all. Many of these chime with the recommendations from governments to improve the IPCC communication work mentioned in the Introduction.[12] Some of them also coincide with the priority areas mentioned by some of the leading candidates to be the new chair of the IPCC to succeed Dr Rajendra Pachauri[13] in late 2015, and the issues raised by other authors and observers outlined in chapter 3.

More detailed recommendations for sectors such as the media or other UN organisations have been overlooked in favour of choosing the following ten broad areas:

- The readability of the SPMs
- Headline statements
- More user involvement in scoping reports
- Derivative products
- The importance of outreach work
- The use of specialist writers
- Metrics to assess effectiveness of the IPCC communication
- The use of graphics, digital technology and new media
- Learning from other reports
- Budgets and resources

Recommendations for each of these areas can be found in the executive summary.

1. The Readability of the SPMs

A strong finding from virtually all of the interviewees is that the SPMs are the main IPCC product that they use in their work. The common view is that these SPMs exhibit the main IPCC characteristics of being authoritative, trusted, credible and legitimate. However, it is also a commonly-held view that the SPMs are not easily readable or digestible by the non-expert consumer. In short, it was felt they were written by scientists for other scientists. This view was eloquently captured by one of the interviewees who argued that the SPMs were 'high quality science', but 'a low quality communication tool', where the language and figures were difficult, complex and too scientific for policy makers.

Many interviewees stressed that more attention needed to be paid to the clarity and accessibility of the language used in the SPMs. Scientific jargon could be easily avoided, they argued. Several examples of clearer language used in other reports on climate science which remained true to the science were given – the US National Climate Assessment Report of 2014 was one that was mentioned several times.

Susan Hassol, who worked as senior science writer and communications consultant on that report, and her colleague Richard Somerville, have highlighted not only words or phrases that are scientific jargon but also ones which mean different things to a general audience than to scientists, such as 'enhance', 'positive feedback' and 'uncertainty'.[14] She, like others, also argues that the confidence and likelihood language used by the IPCC does not work well for most

[12] Available via http://www.ipcc.ch/apps/eventmanager/documents/27/030220150347-p41_inf01_gov_comments_ref_options_paper.pdf

[13] See Jean-Pascal van Ypersele, 'Climate Politics: Does the IPCC have a future?', Guardian 16 March 2015; The Carbon Brief Interview: Jean-Pascal van Ypersele, Carbon Brief, 9 April 2015; The Carbon Brief Interview: Thomas Stocker, Carbon Brief 28 May 2015; The Carbon Brief Interview: Prof Chris Field, Carbon Brief, 10 July 2015.

[14] Somerville R. and Hassol S. 'Communicating the science of climate change', Physics Today, October 2011, available at https://www.climatecommunication.org/wp-content/uploads/2011/10/Somerville-Hassol-Physics-Today-2011.pdf.

audiences, as i) it can make it sound like the scientists don't know anything, and ii) there is a lot of academic research suggesting that people underestimate the risks when such language is used. (Budescu *et al.*, 2009 and 2014)

Moreover, a number of the journalist interviewees pointed out that they changed the language of the SPMs to make it more readable but rarely received criticism from the science community for distorting the science. As mentioned in chapter 3, the former BBC environment correspondent Richard Black gave clear examples of how the SPMs could relatively easily be turned into something clearer, more readable and more digestible.

2. Headline Statements

The practice adopted by the WG1 team of writing two pages of headline statements was widely praised. These were designed to capture the essence of the scientific findings in a succinct and jargon-free way to a wide range of readers. These were approved by governments at the same stage as the SPMs. This practice was adopted for the Synthesis Report but not for the WG2 and WG3, even though they were encouraged to do so by governments. Crucially, the process of shaping the results into communicable units was started early so that the IPCC authors and review teams were able to review them as the chapters and SPMs developed. As Jonathan Lynn explained, in the case of WG2 and WG3 they were added late in the process rather than emerging naturally from the SPM, so it was clear that they would give rise to lengthy discussion and were dropped.

There are two indicators of the success of this model. The keywords from the WG1 headline statement document did appear in print articles, suggesting that this IPCC presentation format may have helped to increase the volume of reporting on WG1. (O'Neill *et al*, 2015, p. 382) Secondly, according to the co-chair of WG1, Thomas Stocker, headline statements generated by this process have made it textually into the decision documents of the international climate negotiations. (Nature 11 Sep 2014) Moreover, Michael Williams, head of the communications at the WMO has used them extensively in his education and outreach work.

This practice should be adopted for all high-level documents of the IPCC, including all WG reports and one-off special studies. The headline statements would also go a long way to meet the requirement from many interviewees for a 'summary of the summary', or in other words a two-page summary of the SPMs, released at the same time as the SPM. Scientific jargon needs to be taken out of the 2-page summary, as in point 1.

A related issue mentioned by several interviewees was that a summary document does not have to follow the chapter structure of the overall WG reports, and headline statements are not needed from each chapter. (For example, this was not the case for WG2.) Policy makers do not divide a science report in the same way a scientist might, and they would probably benefit more from cross-cutting themes and key messages that draw on various chapters. The importance of what policy makers need to know should take preference of what is scientifically interesting.

3. More user involvement in scoping reports

The IPCC's guiding principle is that their reports should be policy-relevant, but not policy-prescriptive. From our interviews with a variety of policy makers, it is clear that the SPMs are very useful as the basis for top civil servants to brief ministers as the essential background for policy decisions. However, it is of note that some interviewees thought that other reports they read and consulted were regarded as more policy relevant, such as the UNEP 'Mind the Gap' report, the annual World Energy Outlook reports from the IEA, and the New Climate Economy report.

In this context, the IPCC should consider seriously the UK government's recommendation for more 'user consultation to gain more insight into how the IPCC might better tailor its products to user needs'. The IPCC could conduct a process by which it engages with its report end users from the outset to help co-design the scoping, structure and language used throughout the report development. This would ensure the final products would align with the requirements and needs of end users such as governments and business sectors and ensure the content of the IPCC reports would better inform decision making.

This approach could follow the recommendations made on requirements for policy formulations and decision-making described in Section 3.4, and simultaneously follow the suggestion from the FCO in Section 4.1 to start with a policy goal (for example preventing or reducing the risk of a worst possible case happening), and work backwards from the goal to the science that is relevant to it, rather than starting with the science, and trying to make it policy relevant.

Within this context, it has been widely recognised that more targeted reports are needed for certain regions of the world such as South Asia or Africa. Such targeted reports would be a good testing ground for a fuller involvement of relevant policy makers to help design the structure and language used throughout the report development. This would fit with a general approach to communications that is more interactive and engaging rather than top-down.

For policy makers at the local level in advanced economies, the WG reports need to provide more relevant, summarised, digestible and incorporate information showcasing new impacts or innovative solutions that are already being used locally. Whilst WG1 is particularly used as a way of making the case for action on climate change, WG2 and WG3 in their current form do not provide sufficiently granular information that can robustly inform decision making on climate change at the local level. As a result local authorities in the UK have turned to other national resources to support this.

4. Derivative Products

Derivative products differ from targeted IPCC reports in that they are produced by outside organisations for targeted audiences without the official endorsement or imprimatur of the IPCC. As outlined in chapter 4, successful examples of these products were those produced by the Cambridge Institute for Sustainability Leadership (CISL) for different business sectors, and the reports produced by CDKN for four different regions or sets of developing countries.

As the researchers and writers observed, a considerable amount of 'heavy lifting' was required to work from the SPMs and WG chapters to turn them into material and reports usable and understandable by the relevant target sectors.

The example of CDKN reports is particularly helpful as two IPCC authors were heavily involved in an unofficial capacity to help ensure the scientific solidity of the reports. As Jonathan Lynn stresses, 'there is a need to get more IPCC authors involved with derivative products. The challenge is to build into the IPCC process more time for them to help with this and other outreach work.'

The challenge is to adapt the IPCC process to allow more deployment of IPCC authors to work with reports and summaries for targeted sectors, perhaps instead of devoting so much effort into the WG reports. The authors need to be 'rewarded' or 'recognised' by their host universities for doing such work, just as much as contributing to the WG reports.

More derivative products could be targeted at different sectors, such as cities. They need not have the official endorsement of the IPCC, but it could be highlighted that individual IPCC authors contributed to the reports.

5. The importance of outreach work

Linked to points 3) and 4) above is the importance of outreach work and events (i.e. presenting the report in different countries to various audiences). These allow the authors to present and discuss the reports in their own words. As outlined in chapter 3, IPCC authors already dedicate a considerable amount of effort to taking their reports around different countries. But more could be done in the future, while recognising that outreach work is expensive in terms of labour and money, both organizing the events and funding authors and other participants. More resources directed to this area of work would be helpful.

There are still challenges in ensuring authors present the information in an audience-friendly way. But feedback suggests it can be a highly effective way of communicating the IPCC science when authors draw on their own expertise and scientific rigour to communicate the findings clearly to local or sector-specific audiences.

6. Specialist writers

As mentioned in chapter 1, the meeting of governments held in Nairobi in January 2015 to review the future direction of IPCC work recommended that the IPCC should 'seek advice from various specialists to make the IPCC reports more readable.'

The recommendation has already prompted considerable discussion about how and when specialists should be introduced into the IPCC writing and review process, and what sort of specialists they should be.

As several observers have pointed out, there is an existing community of social scientists, communication experts and former specialist journalists who have the relevant expertise in this area. Their involvement would undoubtedly help to extend the reach and impact of the reports by making them more readable and digestible.

There are various options for what type of specialists they could be – members of the science community with proven writing skills, former journalists with experience of writing about climate science, or more general communication experts acting in an advisory capacity or a sounding board.

There is less uncertainty about when to bring them in. The successful model of writing headline statements involved considering the 'end product' at an early stage. So if specialist writers are to be used, they need to be introduced early in the writing and review process, and not at the approval stage.

The interviewees in this study saw many advantages but also some disadvantages of bringing in specialist writers. One clear advantage is that their presence should reduce the need for government press offices, and many others, having to perform an 'extra translation service' which turns the IPCC headline statements into their own statements in press releases and other communication work.

Some of the journalists for example recommended bringing in specialist writers whilst others felt it was their job to turn the reports and SPMs into language and messages understandable by their audiences. Most of the NGO representatives welcomed their introduction, whereas some Local Policy Makers felt it was a major challenge to ensure the scientific message was not lost in the process of 'translation'. Members of the business community welcomed such writers, but more into the products designed for them. One of the representatives of the education sector, who has experience of bringing in such writers, pointed out the risks to the intellectual integrity of the final text and of giving over too much power to them over the final product.

For this to happen, there are several obstacles to overcome – there are those within the IPCC process who value the primacy of scientific accuracy and comprehensiveness over simplicity and readability. There is already a clash within the corpus of IPCC authors and co-chairs between those who recognise the importance of speaking with one voice and simple messages, and those who felt outside interference was unwelcome.

However, the overwhelming weight of opinion from the interviewees is that a) specialist writers/communicators should be introduced early as part of the writing and reviewing process; b) the right people exist who know and respect the primacy of the science; c) the right procedures and safeguards can be put in place to ensure the appropriate clarity of roles for such writers; and d) that the scientists and governments have the final sign-off.

Several interviewees also stressed that employing public relations companies was not a recommended path as a) they tend to be introduced at the end when specialist writers need to be incorporated from the start, b) many of them are not going to have the rich experience of writers, journalists or communicators who are steeped in the science and the (effective) language of climate science and climate change communication and c) they may be tempted to give primacy to 'good' messaging at the expense of the basic science.

7. Metrics

There is a general recognition both from IPCC authors and staff that much more can be done to set up more sophisticated metrics to assess the effectiveness of the IPCC reports, including communication. Very little is done at present to track the pick-up of the IPCC reports in international bodies meeting which decide on climate change or in national, regional or local governments. Evidence at the moment is anecdotal as to what policy makers used or did not use, how they used it, and in what way it was useful. Little is known about the way the principal outputs from the IPCC process are taken up and used, even in countries – such as the UK and Norway – which are supportive of the IPCC's work.

This report is a small step in that direction, but such research could be done much more systematically.

Likewise, the media monitoring is rudimentary. As suggested in this report, there are precedents for setting up helpful media metrics. There is also a body of academics in the USA and elsewhere who have experience of doing effective and focused survey work with policy makers. If the IPCC is unable to do this itself, it should be possible to contract an outside organisation with clear guidelines from the IPCC comms team as to how to carry out this research on its behalf on a regular and sustained basis.

The IPCC could a) make use of much more sophisticated media measurements, b) track the formal uptake by governments of the reports, c) assess with more rigour and robust criteria its impact on key policy making fora both

nationally and internationally, and d) select key groups of policy makers or other target audiences to test and monitor the effectiveness of its communication in a more systematic way.

8. The use of graphics, digital technology and new media: There was a general recognition from the interviewees that graphics should be central to the communication of the information found in the SPMs and WG reports. As one interviewee from the business sector expressed it, the right sort of info-graphic was seen as a powerful way of drawing business audiences into being 'carbon literates'. However, there was also a general feeling that many of the IPCC graphics were too cluttered with too much information, which often took some deciphering. It may be that two versions of some of the graphics are needed, one for scientists assessing the science and another for those aiming for clarity of key messages.

Individual graphics that were mentioned as being helpful were the 'Burning Embers' in WG2 and the Carbon Budget in WG1. Info-graphics in other reports such as the 2014 US Climate Assessment Report, or those found in the media were regarded by some interviewees as clearer examples of good graphics. It is also of note that many of the derivative products included graphics based on the SPMs which the users felt worked well. The interviewees from the media said the IPCC graphics were not on the whole transferable for use by their organisations.

Good graphic designers are much sought after in the media at the moment, and many media organisations are devoting considerable resources to improving the digital representation of information on their websites and other platforms. This means the standard of graphics are improving at a fast rate, as are the expectations of the users.

However, it is of utmost importance that the graphic designers also have some background in, or knowledge, of the basics of climate science.

Better graphics, or info-graphics, is part of the urgent need to pay considerable attention to the rapidly changing nature of digital technology, new media and new platforms, which have revolutionised the way people consume information. To give just one indicator of this, social media are now considered more important than print as a source of news in seven of the twelve countries surveyed in the 2015 Reuters Institute Digital News Report. (RISJ 2015) In the other five, younger generations are moving away rapidly from traditional media platforms.

As mentioned in chapter 1, governments have already recommended that the IPCC 'ensure that up-to-date digital technology is used to share and disseminate information.' Unsurprisingly, several interviewees stressed the importance of a revamped social and online media strategy for the IPCC. For example, local policy makers pointed out three immediate advantages: consistent updates on a regular basis, via social media, would enable faster access to up to date knowledge in the field; the use of digital means would be very helpful in making the reports more interactive for example through more info-graphics with more emphasis on clear graphs and data; and technology could help condense and break-up the reports and help navigate to specific themes in the reports. Greater interactivity on the IPCC website was also mentioned by interviewees from the education sector who stressed how students find this a very good learning method.

Leo Hickman, formerly from WWF and the Guardian, has laid out the case for more availability, more training and more engagement from IPCC authors on social media channels. There has been some push back on this idea because of the demands on the time and energy on the part of IPCC authors. However, careful consideration needs to be paid to how much resources the IPCC comms team should dedicate to implementing a new digital strategy themselves, rather than have to rely on the individual actions of IPCC co-chairs or authors.

9. Learning from other reports

The interviewees mentioned a large number of reports which are now published on climate science and the implications for policy at the international, regional and national level. The list is long but prominent are those written by NOAA, IEA, UNEP 'Mind the Gap', World Bank, the Royal Society, and the Potsdam Institute. *Ad hoc* recent reports which have attracted a lot of attention have been the 2014 US National Climate Assessment Report, Risky Business, and the New Climate Economy. Often these were quoted by the interviewees as being better edited and more readable than the IPCC SPMs. (see for example, the experience of the business sector interviewees in 4.2)

Of course the context in which these reports are produced are very different to the IPCC process where every line of the SPM is the result of political approval process by governments. However, as Susan Hassol says, 'the challenges of

writing an IPCC SPM are clearly different to those of writing the US Climate Assessment Report. However, there are clear similarities as well – the US report had to go through several rounds of review and was a tough process. Lots of changes had to be made to accommodate different points of view from the scientists.'

There is a strong need to draw together and pool good practice on communication experiences and techniques from other climate science reports. Despite the different contexts in which these reports are published, much can be learnt from exchanging good and bad practice. The online presentation of the SYR modelled on the US National Climate Assessment Report is a good start: http://ar5-syr.ipcc.ch/index.php

There is also a strong argument for ensuring that the IPCC draws the appropriate lessons from the previous assessment cycle, which some observers have seen as the IPCC's 'missing (learning) loop'. It is important to draw lessons from the whole process of how other reports are produced, and not just how they are communicated through the end product (the WG and Synthesis reports).

10. Budgets and resources

Unsurprisingly, several of the interviewees brought up the issue of the appropriate level of resources, including staff members, for the IPCC communication team. Prima facie, it is hard not to make the case that probably the most important international report on climate science needs more than one staffer (backed up by one or two colleagues), particularly when compared to the enormous amount of person-hours spent on writing and publishing the voluminous WG reports and SPMs. As mentioned in chapter 3, the IPCC has a budget of several hundred thousand pounds for its communication work, which has not always been spent.

However, there are a number of issues to take into consideration. First, there is a huge spike in activity around the time of the release of reports, but there are considerable periods of down time. This is one of the arguments used in favour of bringing in ad hoc outside help around the release of the reports. Secondly, there are well-known but not well-publicised obstacles to governments voting in favour of significant increases in funding for communication work. Scandinavian governments and other European governments may be strongly in favour, but Gulf States may be strongly opposed.

As mentioned above, a strong case can be made for increasing funding for IPCC staff members dedicated to outreach work, and building an online and social media strategy. More resources can also be earmarked for graphics development, pooling good practice, and developing better metrics.

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Advance paper 21

Volume 60(1) – 2011

The new communications climate

by Andrew C. Revkin*

From blogs to videos, Twitter to cell phones, new forms of media provide new opportunities for outreach.

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One of the most enduring needs of societies rich and poor is for reliable and timely information on the weather and, increasingly, on the causes and consequences of grander-scale shifts in the climate system itself.

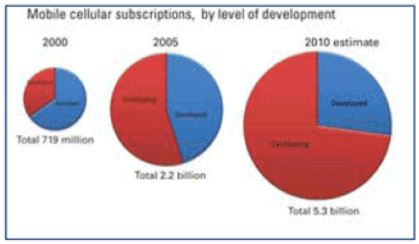
We live at a point in human history when technology and communication would seem to make it entirely possible to serve societies' needs. I have an application on my smart phone that provides a radar loop of regional weather, moment by moment. I can click onto Climate.gov, a Website created recently by the National Oceanic and Atmospheric Administration, and track trends in carbon dioxide concentrations or sea level. The explosive expansion of mobile phone subscriptions in developing countries could soon erase a substantial portion of the digital divide between rich and poor. Already, a rural farmer in Kenya can get her maize price by phone even when she lacks a light bulb or toilet. Imagine when she can also get longer-term precipitation forecasts to help decide which crops to plant.

Bridging the communications gap

But an enormous gap persists between what is possible and what is happening – at least for the moment. One problem, of course, is simply a paucity of data and capacity in places that need it most. The lack of publicly available climate and weather data in much of Africa, recently discussed in a Nature commentary (Thomson et al.), is featured in a WMO Bulletin article linking changing temperatures and malaria. The Rockefeller Foundation is trying to foster another vital kind of communication in Africa – between agencies and organizations focused on climate and those focused on agriculture and water. The University of Colorado Center for Capacity Building is another example of efforts to boost resilience to climate-related hazards in struggling regions.

But my sense is that the gap between information and impact can also be substantially reduced (without a large financial cost) simply if more scientists and scholars, and their institutions, think creatively about ways to expand their communication circles and pathways.

One reason to pursue such steps is that the capacity of traditional journalism outlets to be the intermediary is declining. Overall resources are strained and the number of experienced professional science and environment reporters is shrinking. This doesn't mean science journalism is dying. It is evolving. But it is doing so in ways that won't benefit an agency, say, that sticks with the 20th century model of distributing a press release and waiting for journalists to call back to fill in the gaps. In some ways, in fact, science communication is expanding rapidly. The number of science blogs has grown tremendously, for example. But the number of such outlets that can be relied upon to provide accurate, or un-spun, information is tougher to track. As Nadia El-Wady, the president of the World Federation of Science Journalists, put it last year, there are "only a few pockets of excellence in an ocean of mediocrity."



A mobile future. Mobile phone subscriptions have dramatically increased over the last decade in developing countries, offering new possibilities to communicate climate information.
Source: International Telecommunications Union

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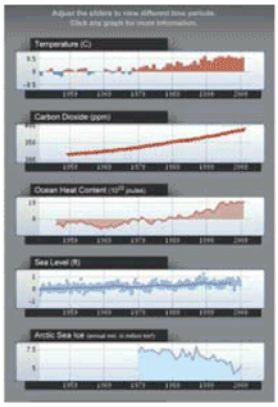
Diving into this arena requires time, some level of culture change and even courage, particularly given how the Web can be an amplifier for unfounded attacks and disinformation as much as knowledge. But hunkering down, as some institutions – including the Intergovernmental Panel on Climate Change – tried to do after recent controversies, is probably not a sustainable approach in the long haul. As the IPCC prepares its Fifth Assessment Report, it does so with what, to my eye, appears to be an utterly inadequate budget for communicating its findings and responding in an agile way to nonstop public scrutiny facilitated by the Internet. I would love to think that the countries that created the climate panel could also contribute to boosting the panel's capacity for transparency, responsiveness and outreach.

I made this point recently in an e-mail exchange with three leaders of the climate panel's next assessment – the chairman, Rajendra K. Pachauri, and Thomas Stocker and Christopher Field, scientists respectively co-leading the reports on climate science and impacts.

They all agreed that more resources and a clear communications strategy are badly needed. "Despite several years of highlighting the need for effective communications and outreach, we have really made very little headway, and I know that we cannot delay action in this area much longer," Dr Pachauri wrote. "If we do, it would be at our own peril."



Trends at a glance. Communicating carbon dioxide concentrations, sea level and other climate trends at a glance, combining the power of communications and the web.
Source: US National Oceanic and Atmospheric Administration's new Climate Services Web pages

Creative models

Here are some examples of creative approaches to improving the science/public policy interface that I see as models for much bigger and better efforts to come.

If you think the misinformation and disinformation surrounding climate is special, check out the Web's offerings on near-earth objects – the array of asteroids, comets and other hunks of rock, metals and ice that swing through Earth's orbit and could, at some point, add a new scar to the planet's crater-pocked surface, but this time with millions people in harm's way. NASA, the only American government agency with a mandate in its founding legislation (1958) to communicate its findings to the public, uses Twitter – in concert with a globe-spanning network of amateur astronomers – to bat down rumors and provide a swift source of updates and basic information. Have a look at the Tweets posted at http://www.twitter.com/asteroidwatch – maintained by the agency's Jet Propulsion Laboratory – and you'll notice another vital feature right away. It's a two-way portal, not simply a place to post news. And, of course, it's global.

The same mix of social and electronic networks can help track and respond to questions and misinformation on weather and climate. There are thousands of amateur weather bugs around the world, not to mention weather forecasters and meteorologists working in the media. The American Meteorological Society is working, through a programme called "Station Scientists," to enhance the capacity of people delivering weather forecasts on television to communicate on related scientific and environmental issues. I wrote in March about the gutsy effort of Bernie Rayno, a senior meteorologist for Accuweather, to refute unfounded assertions by a CNN anchor (a lawyer by training) about radiation risks in the United States from the Japanese nuclear crisis. Jeff Masters, at Wundergound.com, has developed a popular blog exploring climate as well as weather.

The singing climatologist. Think creatively about communicating science concepts to a wide audience.
Source: Dot.Earth blog, *The New York Times*

The American Geophysical Union has started to test new approaches to communication, offering a "Climate Q&A Service" to reporters needing information on new studies or developments. The organization is also hosting a growing array of blogs on geophysical sciences, some written by its staff but many others by independent scientists. Here's its explanation: "By supporting this blogging community, A.G.U. also fosters greater public awareness and understanding of Earth and space sciences, and facilitates more effective use of scientific knowledge to address society's needs." I think it's a great idea.

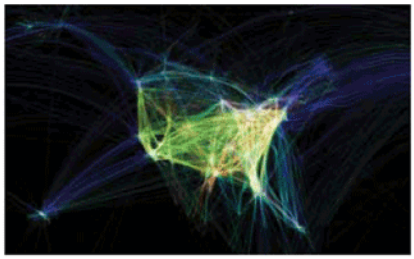
The Royal Society, the world's oldest scientific academy, now has the equivalent of a TV channel where it posts video of its events. I wouldn't expect every climate scientist to be willing to follow the course of Richard Alley of Pennsylvania State University, who's been known to sing and even dance to convey aspects of climate science to students and the wider public. And, of course, he has tenure, providing the flexibility to do public outreach that a younger scientist or agency staffer might lack. But a little experimentation is great. This can be encouraged in students or by putting out a call to the general public to come up with novel ways of communicating science.

Another ripe field is the use of graphics and animation to convey complicated information to broad

audiences. NASA, once again because of its mandate, has an entire Scientific Visualization Studio devoted to this kind of work. I could see agencies and universities creating a kind of match.com for scientific information in search of fresh experiments in visual, and even auditory, communication. I mention sound because I recently came across some experiments using sound to convey the scale and character of the 11 March great earthquake (in one iteration, lower pitch equals deeper depth, louder volume equals more power). Some excellent examples illustrating what's possible in converting dry data to striking, potentially "viral" displays, can be found in the work of Aaron Koblin of Google (see his animated map showing 24 hours of air traffic over North America), Adam Nieman (in discussing climate and ocean issues, I use his image displaying the volume of the world's liquid water and atmosphere as spheres) and at a Website called Visualizing.org.

A common theme in these models is a willingness to experiment and to engage with all publics, including those who might seem hostile at first glance. Harnessing the power of the globe-spanning "crowd" is another. The alternative is to hunker down, as if waiting for a storm to pass. But the explosive changes afoot in how people share information and shape ideas are no stray storm.

Interpreting them that way would be like mixing up weather and climate.



Innovation in communicating data. These depictions of 24-hour air traffic patterns in North America illustrate the potential for communicating visually in new ways. Source: Aaron Koblin, Google

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* Senior Fellow for Environmental Understanding, Pace University Academy for Applied Environmental Studies and writer of the Dot.Earth blog for *The New York Times*.

Top

Advance paper 22

The role of misinformation in undermining IPCC science and how to neutralize it

By John Cook, Research Fellow in Climate Communication, Global Change Institute, The University of Queensland

Communicating the findings of climate science research is integral to raising public levels of climate literacy, which is associated with increased support for mitigation policies. A great deal of research has been conducted into effective methods of climate communication. However, less effort has been directed towards addressing the role of misinformation in undermining communication efforts and reducing climate literacy.

McCright et al. (2015) found that misinformation reduces the effectiveness of climate communication efforts. Similarly, van der Linden (2016) observed that misinformation casting doubt on the scientific consensus on climate change completely neutralizes messages that communicate the consensus. The implication of this psychological research is that climate communicators need to consider the role of misinformation and design their content accordingly.

This is particularly the case with the IPCC, which is a prominent target for the purveyors of misinformation. The release of the IPCC Working Group I report in September 2013 was preceded by a blitz of pre-emptive misinformation designed to undermine the IPCC report and climate science in general (Figure 1).

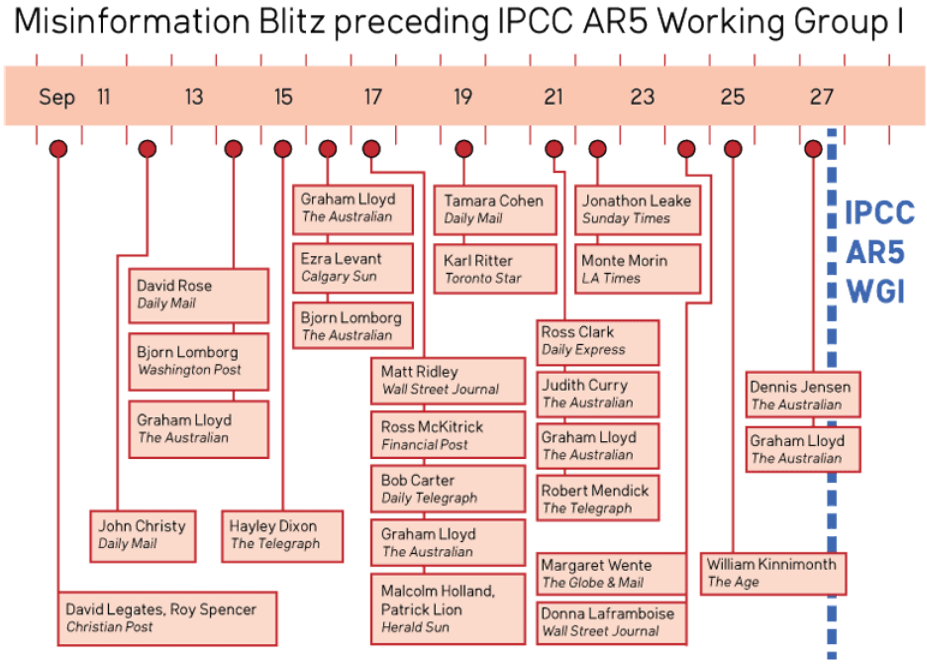

Figure 1: Mainstream media articles casting doubt on climate science and the IPCC report in the lead up to the release of AR5 Working Group I report.

Since 2013, misinformation focused on undermining climate science has persisted. While the common expectation is that public discourse about climate change should transition from questioning the science to discussing policy options, Figure 2 shows how conservative think-tanks and climate blogs have instead moved in the opposite direction, increasing their attacks on climate science over the last decade (Boussalis & Coan, 2016).

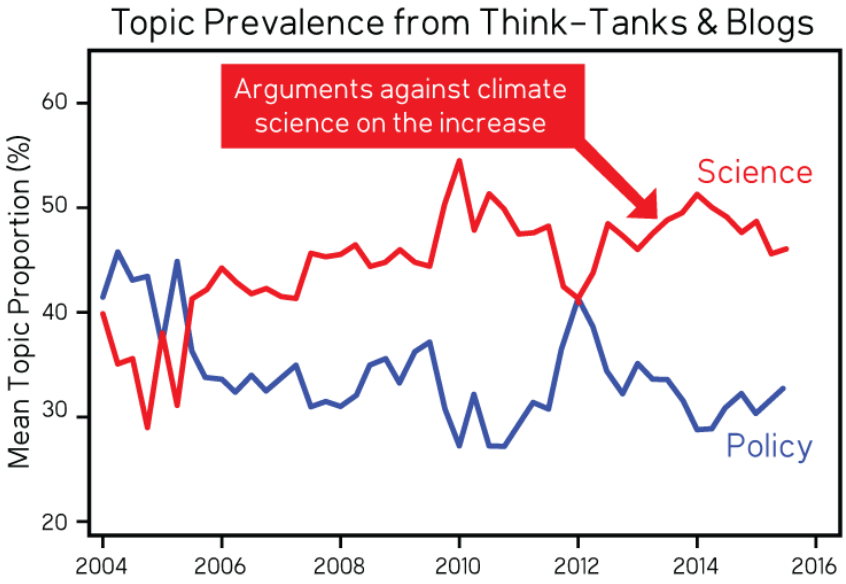

Figure 2: Relative prevalence of arguments against climate science and climate policy from climate blogs and conservative think-tanks through to end of 2015.

Given the persistence of misinformation targeting climate science, and the evidence that such efforts are effective in undermining communication efforts, I recommend that the findings of psychological research, and the assistance of psychological researchers, be incorporated into IPCC communication efforts, thus preserving the efficacy of science explanations (Lewandowsky et al., 2012).

In order to neutralize misinformation, explaining the science alone isn't sufficient. This has been found in a strand of psychological research known as inoculation theory, which borrows the metaphor of vaccination and applies it to knowledge. Just as a vaccination helps build resistance to a virus by exposing people to a weak form of the virus, in the same way, the most effective way to neutralize the influence of misinformation is to expose people to a "weak form" of the misinformation (McGuire & Papageorgis, 1961).

By weak form of misinformation, I mean introducing the myth in a specific fashion:

1. Place primary emphasis on the facts and scientific concepts, explained clearly and concisely. The golden rule of debunking is "Fight sticky myths with stickier facts".
2. An explicit warning (e.g., textual or a visual cue) should be given before introducing the myth.
3. The argumentative technique or fallacy that the myth employs must be explained. Understanding how the myth distorts the facts enables people to reconcile the facts with the myth.

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Advance paper 23

Thoughts from Climate Outreach

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Climate Outreach is Europe's leading climate communication expert

The question of how the IPCC can more effectively communicate its work is central to the challenge of catalysing public engagement with climate change. The problems and issues that the IPCC grapples with on communication are (to a large extent) the same barriers that stand in the way of more effective public engagement in general.

Whether led by governments, science-communicators, or NGOs, very few campaigns or initiatives have been able to communicate about climate change in a way that effectively speaks to a broad range of public values: for most people, climate change is a scientific but not yet a social reality. Most people have not yet heard a story about climate change that sounds like it was written 'for them'.

At Climate Outreach, we specialise in widening and deepening public engagement with climate change. We work with partners from across Europe (and across the political spectrum), to bridge the gap between climate communication research on one hand, and the needs of practitioners on the other.

A consistent and recurring challenge is how to bring together the diverse range of expertise required to develop effective public engagement initiatives. Climate scientists, university communications staff, media experts, social scientists, visual designers, campaigners, storytellers, community leaders and artists all have a role to play. But bringing these perspectives and partners together requires a **strategic and coordinated approach**.

Working together, we can:

- Understand the values and perspectives of different public audiences

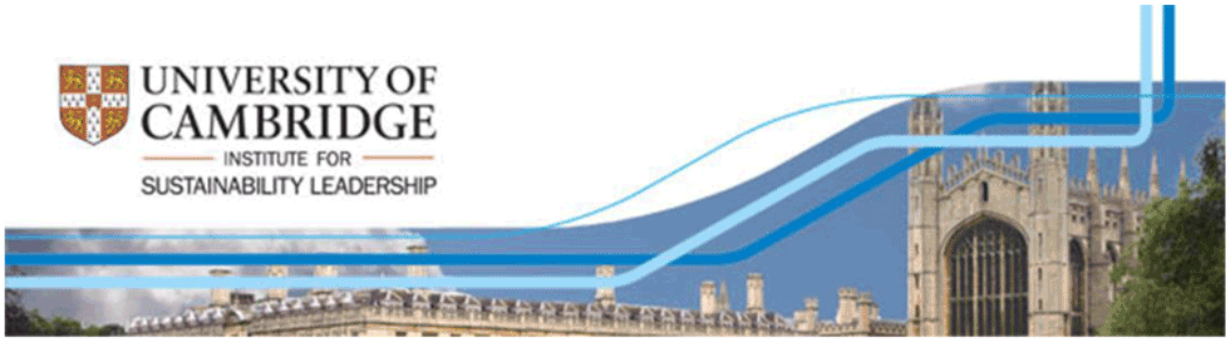
- Synthesise and translate the growing body of academic research on communicating climate change
- Apply this knowledge in a systematic and strategic way to key events and interventions in the public discourse on climate change (an IPCC Report is a very good example of this!)
- Design, trial, and evaluate communications materials and opportunities for participatory public engagement across different regions of the world
- Catalyse a level of engagement with climate change - causes, consequences and societal responses - that does justice to the phenomenal level work that comprises the IPCC process

In 2014, we published a report titled 'Science & Stories: Bringing the IPCC to life'. Based on a series of 16 interviews with leading figures from the UK media and civil society – experts on translating the science of the IPCC for their audiences – we argued that catalysing a proportionate political and public response to climate change means rethinking how climate change is communicated: from science to human stories.

Our report argued for IPCC outputs to be coupled with human stories and powerful narratives which can show the human face of the IPCC, and bring the science to life. By providing science 'on demand', tailored to the needs of different audiences and stakeholders – its relevance and influence could drastically increase.

These are not challenges that the IPCC can meet on its own - and they are challenges shared by the wider climate communication community. But by working with a range of partners who can lend cultural credibility to the scientific consensus they convey – voices and groups from across the social and political spectrum – the findings of the IPCC can be brought to life.

Advance paper 24



Translating IPCC AR5 to Business Audiences

Eliot Whittington, Deputy Director, Policy & Climate Change Business Platforms, CISL, February 2016

The University of Cambridge Institute for Sustainability Leadership (CISL) together with the Cambridge Judge Business School (JBS) and the European Climate Foundation (ECF) undertook to summarise the latest climate science for the business community by developing a series of business briefings based on the IPCC Fifth Assessment Report (AR5). The briefings condense the key findings of the IPCC's AR5 report into clear, short and sector-specific summaries, produced in a variety of different languages.

The briefings distil the key findings of the IPCC's AR5 report into sector-relevant insights on both mitigation and adaptation for an industry audience into short (12 pages), punchy documents. 11 sectors were covered: Buildings, Cities, Energy, Fisheries & Aquaculture, Investment and Banking, Tourism, Agriculture, Transport, Employment and Industry. The sectoral reports were produced over a short period after the IPCC Working Group III findings were published Two more general reports were also published after the IPCC Working Group I report. One describes the process of the IPCC and the AR5, and the other summarises the physical science presented in WGI.

Each briefing report had an author with some familiarity with the topic, but also strong writing skills. They were all reviewed by both academic experts and also supportive business representatives, to ensure both accuracy and accessibility. The University of Cambridge and ECF both took a strong editorial role to maintain quality. Finally IPCC authors were consulted in each case to ensure the result was a faithful translation of IPCC findings. Each briefing also had a partner organisation with relevant expertise and networks who 'owned' that document and could help develop and promote it.

The briefings were produced in a brief, journalistic style, accessible language, and with a strong graphical content, including an infographic to summarise the key findings. All the reports are available at www.cisl.cam.ac.uk/ipcc, along with standalone infographics, and pre-prepared presentations. All materials were produced on a creative commons license to encourage wide usage.

Response

It is difficult to establish exactly how the summaries were received beyond anecdotal evidence, but, below I present some statistics and indications:

- Over 170 articles and blogs were written on the summaries worldwide
- The summaries were featured at more than 30 events, including ministerial level discussions
- The summaries were reposted on more than 120 websites within 3 months of their publication (we stopped tracking website posts after a while, so the total may be much higher)

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Translating IPCC AR5 to Business Audiences - Eliot Whittington, Deputy Director, Climate Change, CISL

- Supportive responses and quotes were provided from a number of businesses including Philips Sainsbury's, Asda, Ferrovial and Standard Bank

The German development agency, "Gesellschaft für internationale Zusammenarbeit" (GIZ), funded a reprint and translation of the summaries into German, French and Spanish for dissemination at COP20 (Lima) and COP21 (Paris). The Clean Energy Wire (CLEW) sought national partners for the German summaries and launched the German versions in a number of high-level forums.

In the run up to COP21, CISL and ECF organised a series of five webinars – discussing the summary briefings on finance, energy, cities, agriculture and extractive industries. Over 500 people registered to attend in total, and the events had strong participation, with senior executives from a wide variety of businesses (e.g. a director of environmental risk from a major bank, an energy director from a major chemicals company, a large number of analysts and researchers from investment companies and more).

Key insights

In delivering this project there were a number of insights that the team delivering this work identified. There is a business audience for accessibly presented climate science, but brevity, targeting and strong presentation are all key to reach that audience. In particular:

- Business is not a single audience. The implications of climate change vary from sector to sector.
- Business readers will not be primarily interested in the detail of the scientific process, or breadth of debate, but instead want indications about what the science is saying about their activities or plans. Given that they may take the time to delve deeper, should they feel it to be required.
- Language about risk and uncertainty is fine, but needs to be presented in a form that is accessible and understood without primers or excessive detail.

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Advance paper 25

What did we learn from supporting the AR5 outreach events in Ethiopia, Kenya, South Africa and Uganda?

Simbisai Zhanje, Project Manager on the Climate and Development Knowledge Africa programme.
(SouthSouthNorth, a non-profit organization based in Cape Town, South Africa is an alliance partner of CDKN and hosts the Africa programme)

The IPCC has encountered criticism from users, including policymakers – its main target audience – and from communications experts that its reports are hard to understand and navigate. Its language is full of jargon, conclusions are hedged about with diplomatic and scientific reservations, and the reports do not always address the priorities of stakeholders.

In responding to this criticism, the IPCC faces many constraints. Some are common to any organization trying to communicate science to various non-specialists. Others arise from the unique nature and function of the IPCC.

Background

In 2013, the Climate and Development Knowledge Network (CDKN) was commissioned by the UK Department for International Development (DFID) to communicate the findings of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) to policymakers, the private sector, researchers and civil society in developing countries. The outreach events co-hosted by the national governments and the IPCC, took place in six countries – Ethiopia, Kenya, Uganda, Bangladesh, India and Pakistan between July and September 2014[1]. In addition CDKN co-hosted a regional event in South Africa, with the Department of Environmental Affairs and the IPCC in November 2014. This advanced paper focuses on the lessons learnt from the Africa outreach events.

The outreach events were a combination of policy dialogue events, journalist trainings and dialogues with young scientists. The events brought national decision-makers, the business community, civil society and academia face-to-face with IPCC scientists, providing a space for debate on the implications of the climate science for their country and what the responses should be.

CDKN produced the following derivative products to support the outreach events:

- Three regional reports on the AR5 (What's in it for Africa, South Asia and Small Island Developing States)
- A free downloadable media toolkit to facilitate discussion and knowledge sharing. The toolkit was comprised of infographics, presentations (with adaptable slides) and high quality images.

These products aimed to communicate the findings of the report in a simple, clear way for each region, targeting different audiences. They allowed for wider dissemination and uptake of the AR5 findings at the policy dialogue events.

Lessons learnt and recommendations

Policy dialogues and young scientist events

- There is a huge demand for more information at the regional and sub-regional level, not just amongst governments and policymakers, but amongst the business sector and civil society too. Participants at the four African events were interested in having more locally specific and actionable information. What should they start to do differently, taking into account their country context?
- The success of the outreach events in part was due to the active engagement of IPCC authors based in-country as they could offer more country context to the findings. They could also engage with young researchers, giving them practical advice on how they could become more involved and how their research can contribute to the Reports. Where possible, nationals of the IPCC authors should be actively involved in outreach events.

[1] In addition to these outreach events, CDKN partnered with the IPCC and the Department of Environmental Affairs, South Africa to host a regional event in South Africa in November 2014. In Asia CDKN partnered with the IPCC to organise presentations by IPCC AR5 authors to the Low Emissions Strategies (LEDS) Asia Forum in Yogyakarta, Indonesia in November 2014. CDKN teamed up with SPREP in Samoa (September 2014) and the Caribbean Community Climate Change Centre in Belize (October 2014) to co-host outreach meetings on the AR5 findings for Small Island Developing States.

- Through the young scientist event, CDKN aimed to encourage more African researchers to publish their research and to consider becoming involved in the IPCC to increase the level of African representation. There was significant appetite and enthusiasm for the event held co-hosted by Makerere University, which attracted 85 students. The students were from different disciplines and it started a dialogue around inter-disciplinary research on climate change – a necessary requirement to effectively deal with the impacts of climate change across sectors. The students were also interested in what it takes to become involved with the IPCC.
- CDKN's limited budget could only bring together participants who lived in the capital cities. This meant that the events tended to have a national-level bias, which was recognised by the participants. Demand was created for similar, more devolved work outside of the capitals.
- Social media played a critical role in sharing the findings from the outreach events, promoted networking and the continuation of the conversation beyond the expanse of the live event.
- Outreach events are expensive, both in terms of human resources and money. Trying to incorporate social media helped in some ways to bring the conversation to people who were not able to join. However this was quite limited and other options such as radio will be investigated for future outreach events.

Recommendations

1. Policymakers are the stated primary target audience of the IPCC, however, they aren't a homogenous group and information needs to be tailored for their use. In some countries, issues of climate change are still seen as the concern of the ministries of environment, who often lack the power to ensure line ministries take action to reduce the negative impacts of climate change and take up the opportunities presented. Working through the IPCC focal points (taking a cross-sectoral approach) and professional communicators would support the uptake of future Assessment Reports.
2. Working and engaging with other audiences, for example businesses, NGOs and the private sector will go a long way to building resilience into development. These 'agents of change' can be used to leverage further government action. However communication to these groups will need to be tailored, and packaged appropriately.
3. The IPCC could look to engage more with regional and country research institutions and centres of excellence to encourage more locally relevant applied research, particularly where gaps have been identified.
4. Linked to having more authors from more African countries actively participating in the outreach events, more support is required by these authors to execute their duties. This support could be in the form of promoting more research fellowships. In a context where there is limited skilled capacity in understanding climate change, African academics are generally overstretched and are often involved in multiple activities including teaching, research and consultancy work. In theory, with greater support, more African researchers would want to become IPCC authors and it would encourage more country-specific research to be undertaken and considered for future assessment reports.
5. The IPCC should consider taking a multi-layered (regional, national and subnational) and sectoral approach to outreach events. This requires a disaggregation of the different stakeholders as the information needs will differ with each layer. This will also require partnering with different organizations and tailoring the message to the different stakeholders.
6. The IPCC should consider engaging with universities, as they are the producers of academic knowledge to encourage a new generation of authors. The engagement should also include supporting the identification of country research gaps in policy relevant areas.

Derivative products and journalist training

- The development of the derivative products was an iterative process along a knowledge chain involving technical scientific experts and professional climate communicators. CDKN established an oversight committee, comprised of IPCC authors and a Co-Chair to ensure that the regional reports maintained the scientific rigour of the IPCC, whilst simultaneously broadening the accessibility of the science to non-scientists.

- There is a high demand for easily accessible information that is tailored to specific audiences. The success of the derivative reports has been in part due to the information being regionally specific and the communicability of the information. Although the IPCC's Summaries for Policymakers is highly regarded, it presents only a global summary and readers must refer to the very long chapters of the Working Group reports for regional data.
- Increasingly people want information that is easy to read and visually appealing. The infographics developed did exactly. Between July 2014 and mid-December 2015, 18,000 people visited the toolkit developed. The Africa toolkit has been viewed more than 1,600 times.
- Different skill sets are required: graphic designers, communicators, scientists and practitioners to ensure that the products will be useful to a broader set of policymakers.
- One of the key aims of the media toolkit was to encourage responsible journalism on the Fifth Assessment Report. Not only is the material being used in articles and blogs, in print, online and multimedia platforms, it is also being used to further educate journalists through workshops and training sessions.
- The media can be a powerful agent that can influence change; however how they do so is dependent on their social, political and cultural context. Therefore what drives their content and the power they may exercise on their audience will change with the context. Within this context, training journalists is key as they package information in a way that can be understood by laymen. The type of training required will need to be tailored to each context, and won't be the same in Uganda or Kenya for example.
- There is significant demand for more journalist and editors training. Training is unlikely to be funded by the media houses the journalists represent.

Recommendations

1. One of the challenges of the process experienced was finding IPCC authors who had a significant amount of time to review multiple drafts. The IPCC through their Technical Support Units could provide this support to partners developing derivative products.
2. Produce outputs that journalists can use for example free high quality images they can use in their stories as well as infographics, highlighting the key message from the assessment report.
3. Establish a communications advisory group that includes professional climate communicators, graphic designers and journalists during the development of the assessment reports, particularly if the IPCC goes on to develop multiple products. This group can advise on the communicability of the products and how the different products can be tailored to different audiences.
4. Work with partners to build the capacity of journalists and editors to understand the assessment reports so that they can produce more compelling and factually accurate media coverage on climate topics and to build their contacts with IPCC authors as future reference points.
5. More emphasis should be put on case studies particularly for the WGIII report: showcasing low-emission options for developing countries as there weren't enough case studies for sub-regions.

Annex 5. Recent Literature

IPCC Expert Meeting on Communication
Oslo, Norway • 9-10 February 2016

This list is not comprehensive. Inclusion in this list does not imply IPCC endorsement or approval of the products or the conclusions they contain. None of them has been subjected to IPCC review.

Building community, credibility and knowledge: the third US National Climate Assessment *Springer Link*, (March 2016)
https://link.springer.com/article/10.1007/s10584-015-1445-8?no-access=true

Engagement in the Third U.S. National Climate Assessment: commitment, capacity, and communication for impact *Springer Link*, (March 2016)
https://link.springer.com/article/10.1007/s10584-015-1568-y?no-access=true

Local science and media engagement on climate change *Nature Climate Change* (21 May 2015)
Candice Howarth and Richard Black,
http://www.nature.com/nclimate/journal/v5/n6/full/nclimate2629.html

The IPCC news circuit *Nature Climate Change* (25 March 2015)
Editorial (contains links to other articles which are behind a paywall)
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2603.html

The IPCC in an age of social media, *Nature Climate Change* (9 February 2015)
Leo Hickman
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2528.html

No more summaries for wonks *Nature Climate Change* (25 March 2015)
Richard Black
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2534.html

UN climate reports are increasingly unreadable, *Nature* (12 October 2015)
Jeff Tollefson
http://www.nature.com/news/un-climate-reports-are-increasingly-unreadable-1.18543

The Psychology of Climate Change Communications *Center for Research on Environmental Decisions* (2009)
http://guide.cred.columbia.edu/pdfs/CREDguide_full-res.pdf

Guide: Managing the Psychological Distance of Climate Change *Climate Outreach & Information Network*. (2015)
http://climateoutreach.org/resources/psychological-distance/

Guide: Communicating Climate Change Uncertainty *Climate Outreach & Information Network*. (2015)
http://climateoutreach.org/resources/guide-communicating-climate-change-uncertainty/

Uncertainty and the IPCC – based on Climate Change special issue
http://talkingclimate.org/wp-content/uploads/2011/10/Uncertainty-the-IPCC.pdf

Effective communication of uncertainty in the IPCC reports
David V. Budescu, Han-Hui Por, Stephen B. Broomell *Climatic Change* Volume 113, Issue 2, pp 181-200 (2012)
http://link.springer.com/article/10.1007/s10584-011-0330-3

Poles Apart? The Social Construction of Responsibility for Climate Change in Australia and Norway
Eckersley, R. Australian Journal of Politics and History, 59, 382–396. (2013)
http://onlinelibrary.wiley.com/doi/10.1111/ajph.12022/abstract

Personally Relevant Climate Change. The Role of Place Attachment and Local Versus Global Message Framing in Engagement
Scannell, L. and R. Gifford *Environment and Behavior* (45): 60-85 (2013)
http://eab.sagepub.com/content/early/2011/10/20/0013916511421196.abstract

Framing and communicating climate change: the effects of distance and outcome manipulations
Spence, A. and Pidgeon, N. *Global Environmental Change* 20: 656-667 (2010)
http://www.sciencedirect.com/science/article/pii/S0959378010000610

Fear won't do it. Promoting positive engagement with climate change through visual and iconic representations (2009)
O'Neill, S. & Nicholson-Cole, S. *Science communication* vol. 30 nr 3: 355-379.
http://scx.sagepub.com/content/30/3/355.short

Explaining topic prevalence in answers to open-ended survey questions about climate change
Tvinnereim, E. & Fløttum, K. *Nature Climate Change* 5, 744–747 (2015)
http://www.nature.com/nclimate/journal/v5/n8/full/nclimate2663.html

Disaster, uncertainty, opportunity or risk? Key messages from the television coverage of the IPCC's 2013/2014 reports
Painter, J. Mètode *Science Studies Journal* (2015)
https://ojs.uv.es/index.php/Metode/article/view/4179

Apocalypse soon? Dire Messages Reduce Belief in Global Warming by Contradicting Just-World beliefs
Feinberger, M. & Willer, R. *Psychological Science* 2011 22: 34. (2011)
http://www.climateaccess.org/sites/default/files/Feinberg_Apocalypse%20Soon.pdf

Think global, act local? The relevance of place attachment and place identities in a climate changed world
Devine-Wright, P. *Global Environmental Change* 23: 61-69. (2013)
http://www.sciencedirect.com/science/article/pii/S0959378012001100

No more summaries for wonks
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http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2534.html

The IPCC in an age of social media
Leo Hickman *Nature Climate Change* 5, 284–286 (2015)
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2528.html

Taking a bet on risk
James Painter *Nature Climate Change* 5, 286–288 (2015)
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2542.html

Media power and climate change
Julia B. Corbett *Nature Climate Change* 5, 288–290 (2015)
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2592.html

Dominant frames in legacy and social media coverage of the IPCC Fifth Assessment Report
Saffron O'Neill, Hywel T. P. Williams, Tim Kurz, Bouke Wiersma & Maxwell Boykoff *Nature Climate Change* 5, 380–385 (2015)
http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2535.html

Science and Stories: Bringing the IPCC to Life
Corner, A., & van Eck, C. *Climate Outreach & Information Network*. (2014)
http://climateoutreach.org/science-stories-bringing-the-ipcc-to-life/

Actionable knowledge for environmental decision making: Broadening the usability of climate science
Kirchhoff, C. J., Lemos, M. C., & Dessai, S. *Annual Review of Environment and Resources*, 38(1), 393. (2013)
http://www.annualreviews.org/doi/full/10.1146/annurev-environ-022112-112828

Formalization and Separation: A Systematic Basis for Interpreting Approaches to Summarizing Science for Climate Policy
Sundqvist, Göran, Bohlin, Ingemar, Hermansen, Erlend A.T., & Yearley, Steven *Social Studies of Science* 45(3): 416-440. (2015)
http://sss.sagepub.com/content/45/3/416.abstract

Climate Science Reconsidered
Rapley, Chris and De Meyer, Kris *Nature Climate Change* 4: 745-746. (2014)
http://www.nature.com/nclimate/journal/v4/n9/full/nclimate2352.html

Narrowing the Climate Information Usability Gap
Lemos, Maria Carmen, Kirchhoff, Christine J. and Ramprasad, V. *Nature Climate Change* 2: 789-794. (2012)
http://www.nature.com/nclimate/journal/v2/n11/full/nclimate1614.html

Breaking the Climate Change Communication Deadlock
Corner, Adam and Groves, Christopher *Nature Climate Change* 4: 743-745. (2014)
http://www.nature.com/nclimate/journal/v4/n9/full/nclimate2348.html

Time for change? Climate Science Reconsidered UCL Policy Commission on Communicating Climate Science
https://www.ucl.ac.uk/public-policy/policy_commissions/Communication-climate-science

Synthesizing a Policy-Relevant Perspective from the Three IPCC "Worlds" – a comparison of topics and frames in the SPMs of the Fifth Assessment Report
Kjersti Fløttum, Des Gasper, Asuncion Lera St.Clair , *Global Environmental Change*, Submitted January 12, 2015

The unseen uncertainties in climate change: reviewing comprehension of an IPCC scenario graph *Climatic Change*, November 2015
http://link.springer.com/article/10.1007/s10584-015-1473-4

Annex 6. Background Documents

IPCC Expert Meeting on Communication
Oslo, Norway • 9-10 February 2016

Background document 1: IPCC Communications Strategy

Background document 2: A Communications Strategy for the IPCC- Implementation Plan

Background document 3: AR5 Communications Strategy

Background document 1

IPCC COMMUNICATIONS STRATEGY

The IPCC at its 33rd Session in Abu Dhabi in May 2011 approved the *Guidance on IPCC Communications Strategy* (referred to below as the Guidance)[1], following the recommendations of the InterAcademy Council (IAC) in August 2010 to develop a communications strategy. This Guidance continues to serve as a framework for IPCC communications and relevant parts of it have been taken up in this document.

Goals

1) The IPCC has two main communications goals:

- to communicate its assessment findings and methodologies, by providing clear and balanced information on climate change[2], including scientific uncertainties, without compromising accuracy;
- to explain the way the IPCC works, selects its authors and reviewers and produces its reports and other products. This will promote the understanding of the reports and underpin its reputation as a credible, transparent, balanced and authoritative scientific body.

Principles

2) IPCC communications are based on the Principles Governing IPCC Work[2].

Communications are an important aspect of the work of the IPCC, essential to its mission of providing decision-makers with rigorous and balanced scientific information on climate change[2] and its impacts. The following set of principles, largely drawn from the Guidance, should guide the IPCC's approach:

- **Objective and transparent**. The Panel's communications approach and activities should, at all times, be consistent with the IPCC's overarching principles of objectivity, openness and transparency.

- **Policy-relevant but not policy-prescriptive**. It is an essential quality of the IPCC's work that it is policy-relevant but not policy-prescriptive. The presentation of its assessments and reports should remain policy-neutral and maintain scientific balance. The IPCC's communications approach and activities should be consistent with these qualities.

- **Drawn from IPCC Reports**. While the IPCC's work and process of preparing reports aim to reflect a range of views and expertise, its communications should reflect the language that has been subject to the IPCC's review process and has been accepted, adopted or approved by the members of the Panel.

[1] http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_comm_strategy.pdf

[2] "The role of the 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. IPCC reports should be neutral with respect to policy, although they may need to deal objectively with scientific, technical and socio economic factors relevant to the application of particular policies." (Principles Governing IPCC Work, paragraph 2). (http://www.ipcc.ch/pdf/ipcc_principles/ipcc_principles.pdf)

- **Recognizing IPCC as a unique organization**. The IPCC's unique process of international assessment by scientists and review by the scientific community, governments and stakeholders, is central to the authority and quality of IPCC reports. The IPCC should always seek to be clear in its communications about what the organization is and what it does – providing up to date assessments of the latest authoritative science. The objective is to ensure that the IPCC provides a context to guide the interpretation of its reports and to ensure that the public has unbiased information about the IPCC.

- **Timely and audience-appropriate**. In order to be effective, the IPCC communications approach and activities should be aimed at ensuring that timely and appropriate information enters the public domain – both proactively to communicate reports, and reactively in response to questions or criticism.

- **Consistent messages.** To ensure that the IPCC delivers consistent messages externally, it is essential that internal communications and decision-making are disciplined and well coordinated.

Activities

3) IPCC communications address four main groups of activities:
   - day-to-day communications, both proactive and reactive;
   - planned activities including:
     - the launch of reports, and
     - participation in major international conferences:
   - rapid responses[3], which require particular procedures to ensure they are handled in a timely manner that is representative of the whole Panel, and
   - provision of scientific and technical advice and guidelines to relevant UN bodies, such as the UNFCCC.

Audiences

4) The primary target audiences of the communications efforts of the IPCC are governments and policy-makers at all levels (including the UNFCCC).

5) Broader audiences, such as the UN, IPCC observer organizations, the scientific community, the education sector, non-governmental organizations (NGOs), the business sector and the wider public, also have an interest in the work and assessments of the IPCC. While these are not primary audiences of the IPCC communications efforts, the IPCC should look for ways to ensure that information is available and accessible for these audiences.

6) While the IPCC itself does not produce derivative products aimed at specific audiences, it may engage with organizations that take elements of IPCC assessments and communicate them in more audience-specific formats. However, such products must not be considered joint productions or in any way products of the IPCC.

7) Engaging and building relationships with the media is an important way in which the IPCC can communicate the information contained in its reports, as well as its processes and procedures.

8) IPCC audiences are truly global in extent and are therefore very diverse. In its communications and outreach activities, the IPCC will take the specific context of different countries into account, which may require tailor-made outreach activities. For instance, this

[3] Rapid response is discussed in more detail in the Guidance p6.

reflects an understanding that the communications needs of developing countries may be different to those of developed countries.

Governance and management

9) The Plenary is ultimately responsible for ensuring that IPCC communications are appropriate and that the Strategy meets the requirements of the Panel and is being delivered suitably. Between Plenary sessions, the Bureau and the Executive Committee will act on the Panel's behalf. Decisions regarding fundamental communications issues, according to their importance, should be debated and approved within the framework of the Bureau and/or the Plenary.

10) The Working Group/Task Force Co-Chairs are responsible for communications activities around reports in their areas, while the IPCC Chair is responsible for communications on the Synthesis Report. The Executive Committee is responsible for communications about the organization as a whole.

11) The IPCC Chair, IPCC Vice-Chairs, Secretariat, Working Groups/Task Force Co-Chairs, Bureau and Focal Points will rely on a Senior Communications Manager, who reports to the Secretary, for expert advice as necessary. The Senior Communications Manager is responsible for the coordination and coherence of IPCC communications and to this end will work with all parts of the IPCC.

12) The Executive Committee will maintain an Implementation Plan that gives effect to this strategy. This Plan will identify, in accordance with the Guidance, those groups or individuals that can approve different types of communications materials and activities in different situations, including rapid response. The Executive Committee will update and develop this Plan as circumstances require and report to the Panel on any updates.

13) The Secretariat will evaluate IPCC communications and report to the Panel, including the type and extent of outreach and media coverage. Evaluation reports should also be made to the Bureau and Executive Committee at regular intervals. The Senior Communications Manager will investigate the use of metrics to support evaluation.

14) The Executive Committee should consider how to ensure continuity of outreach and websites between assessment cycles, and elaborate this in the Implementation Plan.

Methods and tools

15) Consistent with its status as a UN institution, the IPCC's reports should be made available in the six UN languages to the extent possible according to IPCC Principles. IPCC communication practices should follow this model, and communications products, including brochures and press releases, should be translated and made available.

16) The Secretariat will support Focal Points in communications activities in their countries, including the translation of texts into local languages, by providing IPCC materials, where practical. The Focal Points will receive communications materials and information about events in a timely manner, and may seek advice from the Senior Communications Manager on IPCC communications-related matters.

17) Approved IPCC reports and other products form the basis for communications materials. These materials should be developed to facilitate greater understanding of the IPCC's work among governments, media and other non-specialists unfamiliar with scientific terminology. When preparing the final draft of the Summary for Policymakers, Overview Chapters of Methodology Reports and the Synthesis Report, Working Group/Task Force Co-Chairs, the IPCC Chair and authors should be aware of the need to produce clear, comprehensible texts and graphics that support the key findings in the report.

18) The IPCC website serves its target audiences (see 'Audiences') while providing a single entry point to access all IPCC material in a user-friendly manner. The Secretariat is responsible for ensuring that the IPCC website is reviewed regularly to ensure content is up to date, to improve user-friendliness and navigability and to benefit where useful from the latest technology and practices. The Working Groups, Task Force and Synthesis Report Technical Support Units will ensure that their websites are as consistent as possible with the IPCC website. The Secretariat will keep the appropriate use of social media under review.

IPCC spokespeople

19) To ensure objectivity and scientific accuracy, as well as efficiency and timeliness, authorized spokespeople must be designated for various situations. The Chair and IPCC Vice-Chairs are the lead spokespeople for the organization as a whole; the Working Group/Task Force Co-Chairs are the lead spokespeople for the activities of their Working Group/Task Force; the Secretary and Senior Communications Manager may speak on activities and procedures of the IPCC, as well as on institutional matters.

20) Besides these designated spokespeople, authors or Working Group Vice-Chairs will often be the most appropriate people to speak on their area of science and may be requested by the Working Group/Task Force Co-Chairs or the IPCC Chair to talk to the media or represent the IPCC at conferences.

21) People speaking on behalf of the IPCC in an official capacity must focus on communicating a factual, objective presentation of information from the approved IPCC reports and refrain from public statements that could be interpreted as advocacy and compromise the IPCC's reputation for neutrality. This is particularly important for those holding the most senior positions, as they are most closely associated with the IPCC in the view of stakeholders.

22) Those who represent the IPCC in an official capacity are strongly encouraged to undergo media training. Such training should include specific guidance on how to approach speaking on behalf of the IPCC versus speaking in other capacities. The Senior Communications Manager will hold this training as opportunities allow, subject to available resources, and will provide guidelines on communicating with the media and public.

Resources

23) Communications activities must operate with the resources available in the IPCC budget. These may be augmented by additional funding or support from external communications experts, in coordination with the Senior Communications Manager, including for specific communications activities at times of heightened media activity, such as around the release of a report or in rapid response. This must not compromise the independence of the IPCC or cause a conflict of interest.

Background document 2

17 September 2012

A Communications Strategy for the IPCC

Implementation Plan

Introduction

The IPCC Communications Strategy adopted by the Panel at its 35th Session, Geneva, June 2012,[1] is intended to provide direction on the full range of IPCC communications with the main IPCC user groups as well as with media and the public and on establishing and maintaining rapid, clear, and consistent communications. The Communications Strategy is based on the "Guidance on IPCC Communications Strategy" accepted at the 33rd Session of the Panel, Abu Dhabi, May 2011.[2]The working arrangements described below embody a significant amount of flexibility while adhering to the principles and philosophy of the approved guidance underlying the Communications Strategy.

While the ultimate responsibility for communications activities lies with the Panel and fundamental communications issues should be discussed within the Bureau and/or Panel, the Bureau and Executive Committee will act on the Panel's behalf between sessions. The Executive Committee is responsible for communications on a day-to-day basis. As a practical working arrangement, and to facilitate timely and efficient decision-making, the Executive Committee will establish a fully representative subgroup, the Communications Action Team (CAT).[3]

The essence of a flexible implementation is that it should deal as effectively as possible with novel situations. Some of the issues these pose will be handled effectively within the existing working arrangements. Other will require new elements or new perspectives.

Whenever communications work involves novel challenges, it is important to take advantage of the collective vision of the IPCC Senior Communications Manager, the Communications Action Team, the Executive Committee and the Bureau. Even where broader consultation is not required by the Communications Strategy, it may provide great value. Pitfalls, especially for communications involving novel issues, can be avoided by expanding the range of those people commenting on tone, balance, complexity, and content.

This implementation plan covers:

- Who can speak for the IPCC;
- The decision-making process;
- Core communications tasks;
- Other implementation issues including tools and resources.

This note aims to provide clear accountability for decision-making under the communications strategy. At the same time, all who use it should exercise judgment to ensure that necessary action is carried out in an efficient and timely manner and that the working arrangements do not become a barrier to action. The decision-making process is broadly illustrated in a flowchart (Appendix I).

This implementation plan includes provision for review of communications activities but it may be that the plan itself will need to evolve over time and to be adapted, if experience shows this to be necessary. In accordance with the decision of the Panel at its 35th Session, the Executive Committee will update and develop the implementation plan as circumstances require, and will report to the Panel on any updates.

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[1] See http://www.ipcc.ch/meetings/session35/IAC_CommunicationStrategy.pdf; references to this document are as follows: CS §nn – nn indicating paragraph number

[2] See http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_comm_strategy.pdf ; references to this document are as follows: P33G x.py – indicating the paragraph (x) and page (y) respectively

[3] The composition and role of the Communications Action Team are explained in detail in Section 1.3.2 of this note on implementation.

1 PRINCIPLES, SPOKESPEOPLE AND DECISION-MAKING PROCESS

1.1 Overall Principles

1. The timeliness of different communications activities, and the people who draft and authorize them, vary with the type of activity. (CS §2)
2. The Secretariat will advise the Executive Committee, Bureau and Focal Points about new communications materials in a timely fashion, including sending copies of materials as appropriate, and will also report to them regularly on communications activities. (CS §16)
3. All those who undertake communications and information activities on behalf of the IPCC[4] should pay attention to any potential conflict of interest or bias, or the perception of them. (CS §21)
4. Effective external communications depend on effective internal communications. The Communications Strategy aims to foster an open and timely exchange of information among all parts of the organization. The Bureau is invited to regularly review and discuss the efficiency of internal communications (CS §9)
5. To communicate effectively, the IPCC will follow clear and consistent working arrangements that set out who is responsible for initiating, preparing and authorizing communications materials and activities, and who should be consulted or informed. (P33G 5.p6)
6. As discussed in the introduction to this note, this consistency should not be at the expense of the flexibility that allows a given communications team to draw on the insights and experience of other people in the IPCC.

1.2 Spokespeople and representing the IPCC

1.2.1 Spokespeople

7. The IPCC Chair and IPCC Vice-Chairs are the lead spokespeople for the organization as a whole, and may delegate. (CS §19)
8. The Working Group/Task Force Co-Chairs[5] (and, in the case of the Synthesis Report, the IPCC Chair) are the lead spokespeople for their reports and related matters, and may delegate. After publication, Co-Chairs or the IPCC Chair may ask Working Group Vice-Chairs and report authors to speak on behalf of the IPCC on their areas of expertise. (CS §§10, 19-20)
9. The Secretary reports on the IPCC to United Nations meetings and may represent it at such meetings, with the concurrence of the Chair.
10. The Secretary may also speak on activities and Procedures of the IPCC and institutional matters. (CS §19) The IPCC Chair or Co-Chairs may ask the Secretary to speak about the content of IPCC products.
11. The Senior Communications Manager is the initial point of contact for media. In some instances, media will make direct contact with people associated with the IPCC (see footnote 4). In cases where they are approached as representatives of the IPCC, they should inform the Senior Communications Manager and are encouraged to consult with him/her. (P33G 5.p6, CS §11)
12. The Senior Communications Manager may also provide background and procedural information on approved reports and IPCC Procedures. (P33G 5.p6)

[4] This may include the IPCC Executive Committee, other elected members of the IPCC Bureau, and staff members of the IPCC Secretariat and of any of the Technical Support Units, as well as Coordinating Lead Authors, Lead Authors and Review Editors involved in preparing the reports.

[5] The Technical Support Units play an important role in communications for their respective Working Groups/Task Force (or Synthesis Report). References to the Co-Chairs in this note will often in practice mean their TSUs, where the Co-Chairs have delegated responsibility for communications to the TSUs.

1.2.2 Representing the IPCC

13. All those speaking on behalf of the IPCC should be mindful that publicly advocating or expressing personal opinions about climate change, and especially climate change policies, may jeopardize the reputation of the IPCC.
14. Bureau members, authors and review editors must make it clear when they are talking in another capacity and not representing the IPCC. The media and public will not always observe this distinction so speakers should bear in mind when talking that they may be perceived as representing the IPCC in any case. (CS §21). Authors are encouraged to talk about their areas of expertise, but must make it clear when they are speaking in their own right as an expert, rather than representing the IPCC. (P33G 6.p7)
15. The most visible IPCC officials (Chair, Vice-Chairs, Co-Chairs) should be particularly careful as their statements are likely to be attributed to the IPCC, in whatever capacity they speak, and because even carefully phrased statements may be misunderstood. If possible such officials should consult with the Senior Communications Manager before making public statements. (CS §21)
16. Bureau members, staff, authors and review editors must make it clear that honours attributed to the IPCC are attributed to the organization, and not to any individual. The Secretariat will prepare a standard clarification that can be used by IPCC speakers and issued to media, conference organizers, etc when honours are wrongly attributed. (P33G 6.p7)
17. Bureau members are advised to refrain from writing prefaces, forewords or recommendations in reports of interest groups in their capacity as an IPCC Bureau member, because others may perceive this as a form of advocacy. In case a Bureau member still wants to write a preface, foreword or recommendation in his /her capacity as an IPCC Bureau member, he/she is encouraged to consult with the Senior Communications Manager, and in all cases will inform the Senior Communications Manager. (P33G 6.p7)
18. All those who speak on behalf of the IPCC are strongly encouraged to undergo media training. This can range from general training for lead authors at a meeting to one-off specific training. Media training will include the distinction between speaking for the IPCC and for other bodies. (CS §22)

1.3 Decision-making process

1.3.1 Principles

19. The decision-making process for communications materials and activities varies with the type of document or activity and the time available. It must be fully representative, timely and efficient. It respects the IPCC's commitment to objectivity, accuracy, transparency and high scientific standards. It also relies on the Senior Communications Manager for expert advice, to ensure that media needs and practices as well as coordination and coherence are respected, in order to be fully effective. (CS §2)
20. The decision-making process for core communications tasks is described in the section 2, and broadly illustrated in the flowchart in Appendix I.
21. The authorization of communications products needs tailor-made planning that is agreed in advance for each product to ensure a smooth process that may take place under high time pressure, taking into account logistical and practical challenges. The general steps that need to be considered are:
    a. *Description of tasks and responsibilities* of the individuals involved.
    Normally these tasks will be:
        i. Co-ordination of the preparation, production, and release of the communications product;
        ii. Drafting the text;
        iii. Consultations;

iv. Checks that essential consultations have taken place;
v. Authorization;
vi. Before releasing the product to the public, checks that correct authorization has taken place.

b. *Documentation*. During preparation it is essential to have master version management, and to keep everyone who is involved informed about content and process. Preferably this should be in the hands of one person with back-up. It is recommended to archive all correspondence related to the preparation of a communications product, as that may be useful for a possible subsequent evaluation. The checks on consultation and authorization before the actual release must be documented as well. The person that provides the final authorization of the content will seek consensus, and will take full responsibility for the final version. Issued communication material will be recorded by the Secretariat.

1.3.2 Communications Action Team (CAT) (CS §12)

22. To facilitate timely and efficient decision-making, the Executive Committee operates through a sub-group called the Communications Action Team (CAT) as a practical working arrangement for communications activities.
23. The CAT has a number of roles. It is responsible for taking decisions when rapid responses are required (section 2.3.2). It may be consulted on the preparation of launch plans for reports and of communications materials for the launch and further communication of reports (section 2.2.1), and on plans to participate in major conferences (section 2.2.2). It may also be consulted on responses to complex queries, on interview requests, and other proactive communications activities as appropriate. Otherwise its role is to share information and to help coordinate communications activities
24. The CAT is fully representative of all parts of the IPCC, as reflected in the Executive Committee, enabling it to see the broad perspective, but it is small enough to be agile and fast. The IPCC Chair will ensure that the composition of the CAT is fully representative.
25. The full CAT (with deputies in parentheses) comprises:
    i. The IPCC Chair (one of the IPCC Vice-Chairs)[6]
    ii. An IPCC Vice-Chair (another IPCC Vice-Chair)
    iii. A Representative of each Working Group/Task Force (designated deputy). The respective Co-Chairs will designate the representative and deputy.
    iv. The Secretary (Deputy Secretary)
    v. The Senior Communications Manager (Communications Officer)

    Representatives of a Working Group/Task Force on the CAT will regularly consult with and inform all the relevant Co-Chairs.
26. If a member of the CAT is not available, the deputy takes their position automatically to ensure timeliness and efficiency. Members of the CAT representing a part of the IPCC are accountable to that part of the IPCC that they represent.
27. The CAT is chaired by the IPCC Chair or an IPCC Vice-Chair deputizing for the IPCC Chair, in line with the working arrangements for the Executive Committee.
28. The CAT operates by consensus, not by voting. If there is no consensus, the CAT Chair may take the final decision, having regard to the weight of opinion in the team, and recording the differences. The CAT Chair authorizes actions and the release of materials resulting from a CAT decision.

[6] To ensure continuity, the IPCC Vice-Chair listed under point ii will be the one to deputize for the IPCC Chair. In this case another IPCC Vice-Chair will deputize for him or her.

29. In matters involving a single Working Group/Task Force, or issues requiring speedy drafting, the CAT may work with smaller numbers as appropriate to the situation, at the suggestion of the Senior Communications Manager, while keeping the full Executive Committee and CAT informed.
30. The CAT may also decide to invite additional members, including external consultants.
31. The CAT will inform the Executive Committee of its decisions and activities and consult with the Executive Committee as needed. The Executive Committee reviews the activities of the CAT at regular intervals and at least every six months on the basis of reports from the CAT.
32. The Secretariat will provide reports on communication activities to the Panel and Bureau.
33. The CAT also meets regularly to coordinate and brainstorm on communications activities and at short notice on specific matters.
34. The Senior Communications Manager, who acts as secretary of the CAT, may call meetings of the CAT at the request of any member of the CAT and with the agreement of the CAT Chair.

2 HANDLING CORE COMMUNICATIONS TASKS

2.1 Day-to-day communications (CS §3)

2.1.1 Activities

35. Information on the way the IPCC works is an important opportunity to reinforce the message that the IPCC does not engage in advocacy, as well as highlighting its Procedures and adherence to them. The IPCC's communications aim to promote understanding in the media and among IPCC user groups of both the IPCC's scientific messages and of how the IPCC works as an organization.
36. The main IPCC users groups are governments and policy-makers. The IPCC also communicates with media, intergovernmental organizations, non-governmental organizations, scientists and other stakeholders and user groups. (CS §§4,5,7)
37. Communications must be timely and can be proactive or reactive, for instance announcing forthcoming releases of reports, announcing decisions to prepare a new report, announcing important meetings or other activities such as the scholarship programme, informing and liaising with organizations in the United Nations system, responding to media queries, clarifying misunderstandings about the IPCC, tackling factual errors in reporting on the IPCC and its work and responding to requests for speakers at conferences. (CS §2)
38. The IPCC parent organizations – World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) – may also be able to help clarify the IPCC's role in the public domain.
39. The Senior Communications Manager will maintain regular informal contact with the media, including media in developing countries, and promote outreach in all official United Nations languages. This will involve monitoring the media and drawing up a database of journalists who follow environment, climate and related issues. The Focal Points could be invited to assist in building this database. (CS §7)
40. The Senior Communications Manager will handle queries from the media or other IPCC user groups coming into the IPCC and consult as appropriate with the Working Group/Task Force Co-Chairs (or IPCC Chair in the case of the Synthesis Report), the Secretary or other appropriate person in a timely manner.
41. If media queries or queries from other IPCC user groups seeking straightforward factual information come in directly to a Working Group/Task Force or the Secretariat, and the query falls squarely in their area, they can handle the query directly in the interests of timeliness and efficiency.

42. Interview requests received by the Senior Communications Manager or Secretariat will be passed to the most appropriate spokesperson. If members of the Executive Committee receive interview requests directly they should, in case of major interview requests and where time allows, consult with the Senior Communications Manager. This will allow a wider group to be informed and give the Senior Communications Manager the opportunity to provide advice and suggest points that could be highlighted.[7]
43. Where an interview request with a short deadline comes in directly to a Working Group/Task Force Co-Chair, or the IPCC Chair or IPCC Vice-Chairs, they may respond directly, and inform the Senior Communications Manager afterwards.
44. All such Executive Committee members or staff who are interviewed should request copies of the interview (print, pdf, link, or video/audio) and pass it on to the Senior Communications Manager, who will archive them and make them available to the Executive Committee. The Senior Communications Manager also will collect major questions raised in queries and interviews as well as answers provided and share them with the Executive Committee so that the IPCC can respond effectively and in a coherent manner to media concerns and requests for information from other users of IPCC material.
45. Bureau members, authors and review editors may be approached directly by the media, or while speaking at meetings, to give a comment on scientific advances since a report was approved, or to comment on a topical issue. They are free to speak about approved and accepted reports, the outline of reports under production, and the current stage of production of a report, but the scientific contents of a report remain confidential until approved. They may discuss their own research, and their understanding of the state of knowledge, in their own right (See section 1.2 on Spokespeople).
46. The Secretariat, in consultation with the IPCC Chair and Co-Chairs, will provide guidance to authors and other people who may speak on behalf of the IPCC that inter alia will cover the avoidance of advocacy, and speaking when also representing institutions other than the IPCC.
47. Bureau members and the Secretary who receive direct requests to speak at events or contribute media articles in their capacity as IPCC representatives may accept them (and delegate them). They must inform the Senior Communications Manager.
48. The Secretariat will maintain a Joint Outreach Activity Calendar listing planned and invited activities such as speaking at conferences. Bureau members and Technical Support Units are encouraged to enter relevant activities on this calendar.
49. The Senior Communications Manager will keep the CAT informed of major day-to-day communications activities.

2.1.2 Decision-making process for day-to-day communications

50. The CAT provides overall guidance on the day-to-day communications activities discussed in the previous section (2.1.1).
51. The CAT delegates decision-making for these activities to the Senior Communications Manager, who provides regular reports to the CAT on them, and will consult with the CAT or individual Working Group/Task Force Co-Chairs as appropriate. The Senior Communications Manager will consult the CAT on complex and contentious matters. In such cases it may be agreed to use a wider consultation and decision-making process as outlined in Appendix I and/or to seek advice from the Executive Committee.

[7] These arrangements apply to members of the Executive Committee, Technical Support Units and Secretariat. See paragraphs 45 and 46 for arrangements for other Bureau members, authors and review editors.

52. Where complex and potentially contentious matters involve only one Working Group/Task Force, the representative or designated deputy of the relevant Working Group/Task Force Co-Chairs and the Senior Communications Manager will handle them. They prepare responses jointly, the Co-Chairs or representative authorize them and decide with the Senior Communications Manager how they will be released; the Senior Communications Manager informs the CAT. The Senior Communications Manager may suggest expanding this group to other members of the CAT.
53. For simple, non-contentious matters involving a single Working Group/Task Force, and requiring a timely response, such as a simple factual media query or interview request targeting a specific area, the relevant Working Group/Task Force Co-Chairs can act alone, while informing the CAT through the Senior Communications Manager, as appropriate. Again, they are encouraged to use the broader CAT membership as a resource as appropriate if time allows.
54. For complex or contentious queries on organizational matters, the Senior Communications Manager will consult with the Secretary, and will consult the Chair and/or Vice-Chairs and/or Co-Chairs. The CAT may be consulted if necessary. The Secretary and Senior Communications Manager prepare responses jointly. The Secretary authorizes the response; the Senior Communications Manager informs the CAT.
55. For other communications activities or materials, such as those in paragraph 37, the respective Co-Chairs will authorize those related to a report of their Working Group/Task Force, and the Secretary will authorize those related to general and organizational matters after consultations as appropriate.

2.2 Launch of reports, conference participation and other planned communications activities (CS §3)

2.2.1 Launch of reports (P33G 5.p7)

2.2.1.1 Communications plans for the launch of reports

56. Assessment Reports, Synthesis Reports, Special Reports, Methodology Reports and Technical Papers are the main products of the IPCC. The Working Group/Task Force Co-Chairs are responsible for communications activities around reports in their areas, while the IPCC Chair is responsible for communications on the Synthesis Report.
57. Working Group/Task Force Co-Chairs (or in the case of the Synthesis Report the IPCC Chair) will appoint a liaison person to work with the Secretariat on communications activities on that report.
58. Well in advance of the publication of a report, a communications plan will be drawn up to handle the launch and subsequent communications (See section 2.2.1.4 for the drafting and authorization procedures for this plan).
59. The plan will include budgeting for events from all sources (for example, funding may be possible through the approved IPCC budget, other United Nations organizations, earmarked bilateral funding or in-kind contributions) while maintaining IPCC independence. The plan will include budgeting for continuing outreach after the launch of the Summary for Policymakers, including the presentation of the underlying report and subsequent activities.
60. As far as is practical, people representing the IPCC at media events for the launch of reports should undergo media training before the event.
61. The CAT will evaluate the plan and its implementation after the release of the underlying report and related outreach activities.

2.2.1.2 Communications materials and activities for report launches

62. The plan may include advance pro-active briefings and statements for the media by the Senior Communications Manager and the Working Group/Task Force Co-Chairs (or the IPCC Chair in the case of the Synthesis Report) responsible for the report, to ensure that media are aware that the report is coming and understand the process underlying the assessment, without going into substance of the report. It will include where appropriate the launch of the Summary for Policymakers, release of the full report, and subsequent communications and outreach activities.
63. The plan will include press statements grounded in key messages from the approved report and supporting materials (such as the selection process for authors and their affiliations); briefings and presentations for various IPCC user groups; communications materials; and plans for partnership activities with United Nations organizations and others as appropriate. It should also indicate options on how the IPCC can support Focal Points in their communications activities (see also 2.2.1.3).
64. For a Summary for Policymakers, the plan should include a webcast global press conference to launch the report. If time allows this should be rehearsed. The webcast material may be archived for use on the website and elsewhere; alternatively, if time and funding allow, the press conference should be filmed for subsequent archiving on the website and elsewhere.
65. Press materials issued for the launch of reports should be made available in all six official United Nations languages to the extent feasible, although translations may not be available until later.
66. All such press materials, in the original or other languages, will be distributed to Bureau members and to Focal Points. The IPCC welcomes translations into other, non-United Nations languages by governments and will support these efforts e.g. by the provision of documents and figures. (CS §§15-16)

2.2.1.3 Local and regional events

67. The plan should look at the possibility of local launches, briefings and seminars that can highlight regional issues, fully based on the IPCC report content. These would include briefings for policy-makers and the scientific community, as well as the media. The United Nations Department of Press and Information, the IPCC parent organizations UNEP and WMO, including their regional offices, and the Focal Points, among others, may be able to help with these events.
68. Briefings for policy-makers and the local scientific community are of particular value to developing countries. These countries can benefit from tailor-made outreach activities (subject to the availability of resources), taking into account their specific requirements: for example, it may be appropriate to focus on publicizing material via radio rather than print media.
69. To the extent feasible, materials for these events should be made available in the appropriate official United Nations language. The IPCC welcomes translations into other, non-United Nations languages by governments and will support these efforts, e.g. by the provision of documents and figures.

2.2.1.4 Decision-making process for launch and further communication of reports

70. The Secretariat (including the Senior Communications Manager) and the Co-Chairs of the relevant Working Group/Task Force or their designated representatives jointly prepare communications plans for the release of Working Group/Task Force reports (see section 2.2.1.1). They may prepare these plans in consultation with the Bureau of the relevant Working Group/Task Force. The IPCC Chair together with the respective Co-Chairs authorize the plans.

71. The Secretariat (including the Senior Communications Manager) and the IPCC Chair jointly prepare communications plans for the Synthesis Report. The IPCC Chair in consultation with the IPCC Vice-Chairs and Working Group Co-Chairs authorizes the communications plans.
72. The Working Groups/Task Force Co-Chairs, or IPCC Chair in the case of the Synthesis Report, together with the Senior Communications Manager, and in consultation with the CAT as time allows prepare specific communications materials (i.e. press releases, media lines, key messages and slides for presentations) (see section 2.2.1.2). The respective Co-Chairs, or IPCC Chair in the case of the Synthesis Report, authorize them. (P33G 5.p7)
73. The Senior Communications Manager will inform the CAT of these plans and activities in a timely manner.

2.2.2 Conference participation (CS §3)

2.2.2.1 Communication plans for conference participation

74. When the Executive Committee decides that a major international conference, such as the Conference of the Parties to the UNFCCC, warrants substantial IPCC representation, the Secretariat will prepare a plan to ensure that the IPCC makes the best use of those attending, and is effective in delivering its messages. See section 2.2.2.2 for the drafting and authorization procedures for this plan.
75. This plan would include liaison with other United Nations organizations or organizers as appropriate, budgeting, preparation of side events and exhibits, and planning for statements, speeches, media events and press releases.
76. To the extent possible, people delivering speeches and statements on behalf of the IPCC, especially to major international conferences, will circulate them in advance to the CAT for consultation and input.
77. Press statements for such conferences will be drafted and authorized in line with the procedures in section 2.2.2.2. The Secretariat will circulate them to the CAT in advance for comment, and distribute them to the Bureau and Focal Points.
78. Executive Committee and other Bureau members attending other major conferences in an IPCC role are requested to inform the Secretariat via the Outreach Calendar so that the best use can be made of their presence for outreach activities. (See paragraph 76 on the desirability of circulating materials to the CAT in advance if possible.)

2.2.2.2 Decision-making process for conference participation

79. The Secretariat will prepare plans for participation in major international conferences and consult with the relevant Co-Chairs and IPCC Chair (see section 2.2.2.1). If needed, and time permitting, the CAT will be consulted. The relevant Co-Chairs, or in the case of over-arching activities, the IPCC Chair will authorize these plans.
80. The Secretariat and relevant Co-Chairs or IPCC Chair will draft press statements for major international conferences, and circulate them in advance to the CAT for comment. The relevant Co-Chairs or IPCC Chair will authorize them. The Secretariat will issue the press statements and distribute final materials to the Bureau and Focal Points, for information.

2.2.3 Other planned communications activities

2.2.3.1 Examples of other planned communications activities

81. Besides the core activities described in previous sections, the IPCC may want to undertake other planned communications activities. Such activities will often be directed towards the second goal described in §1 of the Communications

Strategy: explaining the way the IPCC works. These could include, but are not limited to:

- press releases on matters not related to reports, conferences or rapid response, for example on the Scholarship Programme;
- other situations where the IPCC Executive Committee takes the initiative to communicate proactively, because an appropriate opportunity presents itself; and
- material explaining how the IPCC works, including addressing common misunderstandings.

82. Other communications activities also include workshops and briefings on the way the IPCC works and the process for preparing reports for media and other IPCC user groups including briefings or seminars for host countries on the occasion of IPCC Sessions and meetings.
83. Such workshops, especially in developing countries, could include training on climate science and briefings for media, junior scientists and decision-makers. The IPCC's meetings schedule offers many opportunities to include these activities, perhaps bringing in outside media experts or working with partners.
84. The Secretariat may produce additional information materials such as brochures and posters, and will consult with the Working Groups/Task Force (and Synthesis Report TSU) on scientific content as appropriate. The Working Groups/Task Force will inform the IPCC Secretariat about information material produced by them and provide the Secretariat with copies for archiving.
85. The Senior Communications Manager will inform the CAT of these plans and activities in a timely manner.

2.2.3.2 Decision-making process for other planned activities

86. Briefings or seminars organized on the occasion of Lead Author meetings, expert meetings and workshops are prepared by the relevant Working Group/Task Force in consultation with the Senior Communications Manager.
87. Any member of the Executive Committee in consultation with the Senior Communications Manager, and the Senior Communications Manager him/herself, may make a proposal to the CAT for a specific proactive communications activity.
88. For major new communications activities, the Secretariat or Working Groups/Task Force will consult the CAT. The CAT will specify who is responsible for drafting and authorizing such activities, in line with the principles laid out elsewhere in this note for core communications in section 1.3 and relevant subsections of sections 2.1 and 2.2.
89. All major proactive communications activities must be brought to the attention of the Senior Communications Manager and co-ordinated as required to assure consistency with other communication activities and to prevent interference with them.

2.3 Rapid response (P33G 5.p6, CS §3)

2.3.1 General considerations

90. Sometimes the IPCC needs to respond rapidly to media enquiries or breaking stories, including acknowledging allegations of errors in IPCC reports, and responding to incorrect coverage of IPCC work or Procedures. This may affect a single Working Group/Task Force or the whole organization.
91. Where a thorough investigation under the error protocol conflicts with the need for a rapid response to media, the Senior Communications Manager, in consultation with the current Co-Chairs (or Chair for an alleged error in the Synthesis Report), will issue follow-up statements as appropriate until it is possible to issue a final statement saying whether the alleged error has been upheld or not.
92. It is understood that not all critical or erroneous reports require a rapid response, or any response at all.

93. It is understood that not all critical or erroneous reports require a rapid response, or any response at all.
94. After a media incident has been handled with a rapid response, the Senior Communications Manager will review the case and prepare an analysis for the Executive Committee to ensure that appropriate lessons are learnt.

2.3.2 Decision-making processes for rapid response (P33G 5.p6)

95. Informing the CAT, working on a response, and authorizing action, are three different processes that may involve different sets of people, as laid out in the flowchart in Appendix I.
96. Any member of the CAT who believes a situation is developing that requires a rapid response will contact the CAT Chair and Senior Communications Manager requesting an immediate meeting of the CAT preferably within 12 hours and no later than 24 hours. This meeting would comprise at least the CAT Chair, a representative of relevant Co-Chairs, and the Senior Communications Manager in the case of a report-related issue, (in the case of the Synthesis Report at least the IPCC Chair, an IPCC Vice-Chair and the Senior Communications Manager), and at least the CAT Chair, Secretary and Senior Communications Manager in the case of organizational issues.
97. If Focal Points or members of the Bureau believe a situation is developing that merits a rapid response, they are invited to alert the Senior Communications Manager or Secretary who will consult the CAT and recommend whether to initiate a meeting, as described in paragraph 95. The Senior Communications Manager or Secretary will inform the Focal Point or Bureau member whether the matter is to be handled as a rapid response or dealt with under day-to-day queries, and keep them informed of the outcome. The Secretariat will set up a specific communications address to ensure that such alerts are not overlooked.
98. Unless a factual statement that resolves a situation can be issued within four hours, the Senior Communications Manager is authorized, without further consultation, to issue a holding statement on the lines of: “We are aware of the issue and we are investigating.” The next statement will be issued within 24 hours in accordance with what is described in the following paragraphs.
99. The CAT will draft a response. It may delegate the drafting of a response to one or more people, paying due regard to timeliness and scientific accuracy.
100. The CAT Chair will authorize statements or courses of action, working to a deadline. It is encouraged to operate as broadly as possible, in the spirit of consultation mentioned in the introduction: The composition of the CAT for these meetings is as in paragraph 95. See paragraph 28 for the resolution of disagreement within the CAT and accountability for its decisions.
101. In rapid response cases, the CAT will work with a checklist[8], which *inter alia* describes how to respond, frequency of meetings, whether to bring in external experts or other organizations and informing the Executive Committee. It works to firm deadlines respecting the media cycle.

2.4 Provision of scientific and technical advice and guidelines to relevant United Nations bodies (CS §3)

102. IPCC Reports and Technical Papers are the main products to be provided to United Nations bodies. They should be made available, to the extent feasible in the 6 official UN languages, to the IPCC parent organizations WMO and UNEP, the UNFCCC, the Office of the UN Secretary-General and all UN bodies registered as IPCC observer organizations, as well as to any other UN body upon request.

[8] The checklist will be a separate document

103. UN bodies may also ask for presentations and briefings on IPCC activities and about the content of IPCC reports. The IPCC Secretariat as the principle point of contact and liaison with any UN body will consult with the relevant Working Group/Task Force on how to meet such a request, and convey to the requesting body who will represent the IPCC. The Secretariat will keep a record of all such requests and how they were met for inclusion in the reports on outreach activities to the Panel and Executive Committee. For major UN conferences the procedures outlined in section 2.2.2 apply.
104. To enhance overall cooperation with the UN system and facilitate the provision of IPCC information, the Senior Communications Manager will participate in the UN communications group on climate change.
105. If the Secretariat receives a specific request for information, e.g. input to a speech by the UN Secretary-General, the Senior Communications Manager will consult with the relevant Working Groups/Task Force on how to respond. Should such a request be received directly by a Working Group/Task Force they will refer it to the Secretariat and consult with the Senior Communications Manager and Secretary on how to respond. The working arrangements outlined in 2.1.2 should be used in case of complex queries.
106. UN bodies offer an opportunity to disseminate IPCC knowledge to wider audiences. Therefore the Secretariat will explore partnership activities with the WMO, UNEP and other relevant UN bodies.

3 TOOLS AND RESOURCES

3.1 Communications tools

3.1.1 General considerations

107. The Secretariat will monitor, evaluate and where appropriate take advantage of new technologies and practices to enhance IPCC communications activities.

3.1.2 **Websites** (CS §18)

108. The Secretariat will regularly review the IPCC website to ensure content is up to date, to improve user-friendliness and navigability and to benefit where useful from the latest technology and practices. The Working Groups, Task Force and Synthesis Report Technical Support Units will ensure their websites are as consistent as possible with the IPCC website and keep content, navigation and technology under review.
109. The websites serve different stakeholders, including (but not only) governments, the scientific community and the media.
110. The main IPCC site should be the principal point of entry, and the Secretariat will work to ensure that it provides access to all IPCC products in easy to navigate and searchable form. Given that many people start with Working Group/Task Force or Synthesis Report sites, the Working Groups/Task Force and Synthesis Report TSU will ensure that navigation is easy from there too.
111. The Secretariat will ensure that core IPCC documents such as the IPCC Principles and Procedures (including the Error Protocol and Conflict of Interest Policy), all completed reports and other relevant material including the calendar of events and meetings are clearly signposted.
112. Public information about works in progress will reside on Working Group/Task Force sites, while published products will also migrate to the main site, mirrored on the relevant Working Group/Task Force (and Synthesis Report TSU) site. The Secretariat and Working Groups/Task Force (and Synthesis Report TSU) will cooperate to ensure that this happens.

113. The Working Groups/Task Force (and Synthesis Report TSU) will publish the names and affiliations of authors on websites as soon as the selection process is completed, with a link to the relevant procedures governing selection, and to the relevant report. This material too will migrate to the main site in the same way as the report (see paragraph 111).
114. After finalization of a report, the IPCC website and relevant Working Group/Task Force website will post first and second-order drafts, comments and responses, all clearly signposted.
115. Working Groups (and the Synthesis Report TSU) will display accepted FAQs from their reports separately on their websites, and the Task Force will display FAQs relating to technical matters addressed by the Task Force, besides their inclusion in the reports published on the websites. This material too will migrate to the main site in the same way as the report (see paragraph 111).
116. Material describing the organization and processes of the IPCC will be posted on the main IPCC website. For consistency, Working Group/Task Force websites should use this material.
117. The websites will also provide glossaries from the reports and IPCC Supporting Material (including material prepared by the Task Group on Scenarios for Climate and Impact Assessment (TGICA) and the Database of Greenhouse Gas Emission Factors (EFDB) as well as material authorized for this purpose by the CAT in consultation with the relevant Working Group/Task Force Co-Chairs or IPCC Chair in the case of the Synthesis Report.
118. The IPCC main website will provide clear entry points for users of IPCC material that has been translated into other United Nations languages, while indicating that the English-language pages carry a greater volume of material that is more regularly updated.
119. The website will include a clear entry point for media to facilitate their enquiries about the IPCC and its products.

3.1.3 Social media

120. Social media have become an essential tool for communicating with the media. Disciplined use of social media can spread awareness among the media of IPCC activities, for instance forthcoming press conferences and report releases, as well as communicating key messages from the reports.
121. The Secretariat will keep the use of social media under review to ensure the IPCC is benefiting from up-to-date technology and practices. (CS §18)

3.2 Communications resources (CS § 23)

122. Financial and human resources for communication activities will be provided by the budget allocated from the IPCC Trust Fund and may be supplemented through additional funds that the Working Group/Task Force Co-Chairs or IPCC Chair are able to secure from other sources for specific communications activities, while maintaining IPCC independence. Obtaining such funds must not affect the IPCC adversely. The Secretariat will provide the Panel with reports about resources available and activities carried out. (CS §23)
123. The Secretariat and Working Groups/Task Force may use consultants to supplement IPCC staff if needed, provided there is full transparency about their role and how they were selected. (CS §23, P33G 7.p8)
124. The IPCC Secretariat should make standby arrangements to access crisis communications services that can support rapid responses. It will select an individual or company according to WMO rules, and the Chair and Co-Chairs will be consulted to the extent feasible. The Secretariat will brief the selected individual or company about how the IPCC works. (CS §23)
125. The Secretariat and Working Groups/Task Force Co-Chairs should also look at the possibility of sharing media resources used in one part of the organization, taking budgetary implications into account.

126. For regional or complex communications issues, the IPCC can draw on the resources of the United Nations Department of Press and Information (DPI) and of partner and parent organizations such as the United Nations Environment Programme (UNEP) or the United Nations Economic Commissions. Other similar forms of cooperation should be sought.
127. Networks of communications experts from the United Nations system, the academic community, business and NGOs can also provide advice.
128. It is important not to overlook the specific communications needs of all countries, especially developing countries, and linguistic challenges. (CS §8)
129. IPCC media resources and planning should strive to reflect the fact that different countries have different media requirements and needs (see for example paragraph 68). (CS §8)
130. DPI, UNEP, WMO and United Nations Economic Commissions and informal expert networks can help with IPCC communications. The flexibility to add regional resources, even on a consultant basis, should be retained in order to better serve the communications needs of a group of countries.

4 OTHER IMPLEMENTATION ISSUES

4.1 Evaluation metrics (P33G 8.p8)

131. The Secretariat will provide the Panel with a consolidated progress report including forward-looking proposals on communications. (CS §13)
132. This report will consider metrics looking at the impact of the IPCC in the media. Options could include quantitative monitoring of reports mentioning IPCC, in general and tied to specific events, and impact assessments. However, many such metrics are heavily weighted to online and social media. Reliable qualitative metrics that are affordable and not too labour-intensive need to be identified.

4.2 Media training (P33G 5.p7)

133. The Secretariat, working with the Working Groups/Task Force Co-Chairs, will endeavour to offer media training to all those who may speak for the IPCC. All are encouraged to take this training before speaking on behalf of the IPCC. (CS §22)
134. Media training will be offered both generally and for one-off needs. The provision of media training is subject to available resources. (CS §22)

4.3 Language (P33G 4.p5)

135. The Secretariat will issue major press and other statements, as far as practically feasible, in all six United Nations languages. In many cases, especially in rapid response, they will be issued first in English. (CS §15)

Appendix I – Flowchart broadly illustrating the decision-making process

External communications*: Panel *is responsible for communications; between sessions
Bureau and ExCom *act for* Panel[9]

ExCom *delegates communications activities to* CAT (§22)

Representatives of a Working Group/Task Force on the CAT *regularly consult with and inform* the relevant Co-Chairs (§25)

ExCom *regularly reviews* CAT activities (§31)

CAT *reviews activities and exchanges ideas and information on regular basis; reports to* ExCom / Bureau / Panel (§§31-32)

1. Day-to-day communications	2. Launch of reports and other planned communications activities	3. Rapid response

Key

Authorizes	Takes the decision to approve the text of a statement and issue it, or approve a plan or action, and arranges to have it released through the appropriate channels (see paragraph 21)
CAT	Communications Action Team (The CAT operates by consensus, in the configurations described in this note, with the CAT Chair taking decisions in line with the prevailing view in case of deadlock, as in the ExCom. Effectively, the CAT Chair is responsible for CAT decisions. It is fully representative of the ExCom.)
Chair	Understood to be IPCC Chair unless CAT Chair is specified
CM	Senior Communications Manager
Co-Chair	Understood to be one or more relevant Working Group/Task Force Co-Chairs
Drafting Team	One or more people appointed by the CAT to draft a statement or response; the CAT could also make itself the drafting team
ExCom	Executive Committee
Launch Plan	The plan for communicating a report on publication and subsequent outreach activities (**not** a plan for approving the report itself!)
Organizational	Relating to questions about procedures, the institution, the organization, or questions affecting the whole IPCC
Report-related	Relating to an individual report; typically in the area of responsibility of a single Working Group
S/IPCC	Secretary of the IPCC
WG	Working Group/Task Force (if not specified, the relevant Working Group or Task Force or their Co-Chairs)

See Tables 1-3 below

[9] IPCC-33 Guidance; Preamble, last paragraph

<table>
<tr><td colspan="5">1. Day-to-day communications (section 2.1)</td></tr>
<tr><td colspan="2">Report-related
(if query comes into Secretariat, CM refers to appropriate WG)</td><td colspan="2" rowspan="2">Organizational
(if query comes into WG, WG refers to CM)
CM consults with S/IPCC</td><td rowspan="2">Interviews</td></tr>
<tr><td>Complex query
(Non-routine and potentially contentious)
(§52)</td><td>Simple query
(Simple non-contentious request for factual data)
(§§41, 53)</td></tr>
<tr><td>Co-Chairs and CM draft and may consult CAT
(§23)
Co-Chairs authorize response (§52)
Secretariat or WG issue response
Secretariat records response
CM informs CAT
(§21)</td><td>Co-Chairs draft
Co-Chairs authorize response
(§53)
Co-Chair informs CAT through CM as appropriate</td><td>Complex or contentious query (§54)
S/IPCC and CM draft, consult Chair/Vice-chairs/Co-chairs and may consult CAT
S/IPCC authorizes response
(§54)
Secretariat issues and records response
CM informs CAT (§21)</td><td>Straightforward factual request about procedures or organization
(§41)
CM drafts
S/IPCC authorizes response (§55)
CM issues response
CM informs CAT as appropriate</td><td>Whoever receives request consults CM; if received in Secretariat CM passes to appropriate ExCom member
(§42)
CM may consult CAT
(§23)
CM forwards comments and suggestions to interviewee
Interviewee requests copy, forwards to CM (§44)</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td>Wide-ranging interview
(Request would benefit from broader consultation)</td><td>Simple, urgent
(Sent directly to Chair, Vice-Chairs or Co-Chair, non-contentious, local media and/or urgent deadline)
(§43)
Chair, Vice-Chair or Co-Chair conducts interview
informs CM
forwards copy if available to CM
(§44)</td></tr>
</table>

2. Launch of reports and other planned communications activities (section 2.2)

Report launch (section 2.2.1)

Participation in major international conferences (section 2.2.2)

Working Group reports	**Synthesis reports**	ExCom *authorizes participation in major event* (2.2.2.1,§74)
Launch plan (section 2.2.1.1, §70)	**Launch plan** (section 2.2.1.1, §71)	Secretariat *drafts communications plan*, *consults* Chair/Co-Chairs; *may consult* CAT (§79)
CM and Co-Chair *initiate*	CM and Chair *initiate*	Co-Chairs or Chair *authorize communications plan*
Co-Chairs, Secretariat *draft*	Chair, Secretariat *draft*	CM *informs* CAT
They *may consult with* relevant WG Bureau,	They *consult with* Vice-Chairs, Co-Chairs	
Chair, relevant Co-Chairs *authorize*	Chair *authorizes*	
CM *informs* CAT, WG *informs* WG Bureau	CM *informs* CAT	
Press materials for launch (sections 2.2.1.2, 2.2.1.3, §72) **(and subsequent communications/outreach events)**	**Press materials for launch** (sections 2.2.1.2, 2.2.1.3, §72) **(and subsequent communications/outreach events)**	**Press and other statements for major international conferences** (section 2.2.2.2, §80)
Relevant Co-Chairs, CM *draft*	Chair, CM *draft*	Secretariat, relevant Co-Chair or Chair *draft*
They may *consult* CAT	They may *consult* CAT	Circulate to CAT for comments
Co-Chairs *authorize*	Chair *authorizes*	Co-Chairs or Chair *authorize*
Secretariat *issues and records materials* (§21)	Secretariat *issues and records materials* (§21)	Secretariat *issues and records materials* (§21)
CM *informs* Bureau, Focal Points (§66)	CM *informs* Bureau, Focal Points (§66)	CM *informs* Bureau, Focal Points (§80)

3. Rapid response (section 2.3)

Either

CAT member *informs* CAT Chair and CM that *situation requiring rapid response is developing* (§95)

↓

Or

Bureau member / Focal Point *requests* CM or S/IPCC *to initiate rapid response* (§96)

↓

CM or S/IPCC *consults* CAT and *recommends whether to initiate meeting*

↓

If yes: CM or S/IPCC *inform* Bureau Member / Focal Point *that matter is dealt under rapid response*

↓

CAT Chair *calls immediate meeting* (§95)

↙ ↘

If not: CM or S/IPCC *inform* Bureau Member / Focal Point *and matter may be dealt with under day-to-day queries*

(See Table 1)

Report-related

CAT (at least CAT Chair, representative of relevant Co-Chairs, CM) *meets* (for Synthesis Report at least Chair, a Vice-Chair, CM)

↘

Organizational

CAT (at least CAT Chair, S/IPCC, CM) *meets*

↙

Can the matter be resolved quickly and simply?

↓

If yes:

CAT *drafts response* (§98)

↓

CAT Chair *authorizes and issues quick, factual statement* (§99)

↓

Secretariat *records response* (§21)

↓

CM *informs* ExCom *(and* Bureau member*,* Focal Point *if appropriate)* (§§31, 96)

If not:

CM *issues holding statement* (§97)

↓

Secretariat *records response* (§21)

↓

CAT *may bring in more members, consult more widely if time allows; otherwise keeps* full CAT *informed; keeps* ExCom *informed* (§31)

↙

CAT *appoints drafting team* (§98)

↙ ↘

Report-related

↓

CAT drafting team *drafts response*

↓

CAT (at least CAT Chair, representative of Co-Chair, CM; for Synthesis Report at least CAT Chair, a Vice-Chair, CM) *reviews statement or action*

↓

CAT Chair *authorizes statement or action on behalf of CAT* (§§28, 99)

↓

Secretariat *issues and records response* (§21)

↓

CM *informs* Bureau and Focal Points *of outcome, distributes statements*

(the steps in this box may be repeated as many times as necessary)

↘

Organizational

↓

CAT drafting team *drafts response*

↓

CAT (at least CAT Chair, S/IPCC, CM) *reviews statement or action*

↓

CAT Chair *authorizes statement or action on behalf of CAT* (§§28, 99)

↓

Secretariat *issues and records response* (§21)

↓

CM *informs* Bureau and Focal Points *of outcome, distributes statements*

(the steps in this box may be repeated as many times as necessary)

↙

CM *conducts review of handling of incident* (§93)

Background document 3

AR5 COMMUNICATIONS STRATEGY

Other communication and outreach activities

Communications Strategy

As requested by the Panel at its Thirty-Fifth Session in June 2012, the Executive Committee elaborated an Implementation Plan for the Communications Strategy and reported on its completion to the Bureau and Focal Points. A sub-group of the Executive Committee, the Communications Action Team, has met regularly to review communications activities.

Outreach events

The IPCC took part with two side events at the UN Conference on Sustainable Development (Rio+20) in Rio de Janeiro in June 2012. Both examined the science/policy interface, taking the two most recent special reports, SRREN and SREX, as examples. The first side event was part of the Forum on Science, Technology and Innovation for Sustainable Development organized by the International Council for Science (ICSU) and others in the run-up to the conference. The second was a side event at the conference proper. Details can be found at:
http://www.ipcc.ch/news_and_events/outreach.shtml

The IPCC then held two side events at the UNFCCC's COP18 in Doha in November, one on SREX and one on SRREN. Both events were very well attended, testifying to continuing interest in the reports and to the IPCC's activities in general. Also at COP18, the IPCC held a series of meetings with business, environmental and youth NGOs. The focus was on explaining our plans for AR5.

Preparations for AR5

COP18 also provided an opportunity to brief media on preparations for AR5, with two workshops on IPCC procedures, including the process for producing reports. One of these was open to all media, and the second targeted journalists from developing countries invited to Doha by the UNFCCC under its own outreach and training programme.

Rapid response

There were no events requiring a formal rapid response. Nevertheless, a number of incidents required an urgent and consultative response, prepared largely in line with the rapid response procedures laid out in the Communications Strategy Implementation Plan:

1. New Scientist article
   An article in the New Scientist on 18 June 2012 contained several factual errors. The IPCC issued a statement on 24 June (http://www.ipcc.ch/pdf/ar5/statement/newscientist.pdf) and secured corrections to the article.

2. Nobel Peace Prize
   Public discussions about the 2007 award of the Nobel Peace Prize justified the issue of a clarifying statement. (http://www.ipcc.ch/pdf/nobel/Nobel_statement_final.pdf)

3. Unauthorized posting of WGI's Second Order Draft
   An expert reviewer posted WGI's entire Second Order Draft on his website, from where it was widely reposted, prompting a discussion in the media and social media about the contents of the forthcoming WGI AR5 report. A statement was quickly issued. (http://www.ipcc.ch/pdf/ar5/statement/Statement_WGI_AR5_SOD.pdf)

4. Unauthorized posting of WGII's First Order Draft and other materials
   A blogger published the contents of three memory sticks distributed at Working Group II Lead Author Meetings, including the Zero Order and First Order Drafts, with responses. Again, a statement was issued in a little over four hours.
   (http://www.ipcc.ch/pdf/ar5/statement/Statement_WGII_AR5_FOD.pdf)

The Executive Committee and the Communications Action Team have reviewed the lessons learnt from the handling of the unauthorized postings of Working Group drafts.

Media monitoring

The Secretariat provides monthly reports to the Executive Committee on communications activity and media coverage of the IPCC. These draw on data from a media monitoring company, Meltwater Group, to provide basic evaluation by counting the number of articles about the IPCC on online media and blogs, and rating them as positive, negative and neutral, depending on certain words appearing in the articles. For September-December 2012 a total of 16,332 articles containing "IPCC", "Intergovernmental Panel on Climate Change" or "Pachauri" appeared, of which 1,103 were rated positive, 1,286 were rated negative and the rest were unclassified.

Other communications activities

Since P-35, besides, the statements mentioned above, the IPCC has issued a press release on the completion of the review of processes and procedures, two press releases on the start of new stages of the AR5 review, one press release on the start of the expert review of the TFI's 2013 KP Supplement, and a press release on the call for applications for the second round of awards under the Scholarship Programme, translated into all UN languages. The Secretariat routinely uses social media such as Facebook and Twitter to draw attention to press releases and statements.

Senior IPCC figures have given a large number of interviews. Journalists attending COP18 sought interviews with Rajendra Pachauri and Jean-Pascal van Ypersele. Extreme events such as Tropical Storm Sandy and the recent heatwave and fires in Australia also stoked interest. Chris Field was in demand in the wake of Sandy, and Australian media took advantage of the presence of Rajendra Pachauri and Thomas Stocker for WGI LAM4 to ask about extreme weather there. Both WGIII at its LAM3 in Vigo, Spain, and WGI at LAM4 in Hobart, Tasmania, organized press conferences.

Future activities

Work in the coming months is focused squarely on the preparations for the launch of AR5. This will include briefings for media in various locations to explain how the IPCC works, including the process for producing reports. We are also working with partners in the WMO, UNEP, the UN DPI, scientific research institutes and NGOs to share information on and coordinate activities to communicate AR5.