



Catastrophe
and Climate

Research Program Newsletter

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Bonus edition on the IPCC WG II Sixth Assessment Report - Impacts, Adaptation and Vulnerabilities, as well as other timely topics regarding sustainability-related and climate-related disclosures.

By Priya Rohatgi, ASA

This Bonus edition of the Catastrophe and Climate Committee Newsletter focuses on the [IPCC AR6 WG II report](#) - *“This report recognizes the interdependence of climate, ecosystems and biodiversity, and human societies and integrates knowledge more strongly across the natural, ecological, social and economic sciences than earlier IPCC assessments. The assessment of climate change impacts and risks as well as adaptation is set against concurrently unfolding non-climate global trends e.g., biodiversity loss, overall unsustainable consumption of natural resources, land, and ecosystem degradation, rapid urbanization, human demographic shifts, social and economic inequalities and a pandemic.”*¹

We share with you a brief overview of the report by *Sam Gutterman*, our Committee member, who has been actively engaged in environmental issues, impacts and risks of climate change and a proponent of adaptation, for over a decade now.

The newsletter also reflects on some recent announcements. The SEC proposed rule changes and made it mandatory for public companies to disclose Climate related information. The International Sustainability Standards Board (ISSB) recently published the Exposure Drafts on climate and general sustainability-related financial disclosures.

In the following section ‘Additional thoughts’, we have provided links to the factsheets published by IPCC, news articles and recordings of the webinars/interviews featuring scientists involved in the development of the report for more insights.

Also, last month IAA released a paper based on the *IPCC AR6 WG I – [Climate Change 2021: The Physical Science Basis](#)* report, tailored to the actuarial community and have a webinar scheduled on April 13th.

We hope you find this informative and helpful.

Points of view

IMPACTS, ADAPTATION AND VULNERABILITY BY THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Sam Gutterman, FSA

The Intergovernmental Panel on Climate Change (IPCC), a body of experts convened by the United Nations, recently completed the second of three² broad and deep reports on climate change that form a part of its Sixth Assessment

¹ https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

² The first, published in June 2021 entitled “The Physical Science Basis”, summarizing the current status of climate science. The third, scheduled to be published on April 4, 2022, will be entitled “Mitigation of Climate Change” that will evaluate humanity’s options for battling climate change, including ways of reducing greenhouse gas emissions—a summary will be provided in the next Newsletter. More than 270 researchers from 67 countries participated in writing the second report.

(2021 and 2022). This report, entitled “Impacts, Adaptation and Vulnerability” (37-page Summary for Policymakers, 98-page Technical Supplement, and 3,675-page full- report), can be found at: <https://www.ipcc.ch/report/ar6/wg2>.

This report, drawing on thousands of academic studies and papers from around the globe, paints a dire future for our planet, with an escalating toll of losses and damages caused by climate change. It concludes that there will be widespread disruption, and even a lot of deaths. The adverse impacts of climate change are mounting much faster than scientists predicted even in its last assessment, eight years ago. The report, with a focus on equity and justice, provides extensive regional information that can be used to facilitate climate-resilient development, underlining the urgent need for climate action.

Low-income countries, with the least capacity and resources to adapt, have generated only a tiny fraction of global greenhouse gas emissions, a primary driver of climate change. Yet they are expected to experience the vast majority of damages and deaths.

António Guterres, the U.N. Secretary General, said of the report that it is “an atlas of human suffering and a damning indictment of failed climate leadership.” Yet, in a glimmer of optimism, it also suggests that the world still has a chance to choose a less catastrophic path and significantly reduce the potentially dramatic adverse consequences. However, this chance is based on transformational change on a global scale that will challenge every country.

It is well known that, as the saying goes, prevention or building a more resilient environment is far less expensive than recovering from the consequences of an unanticipated adverse event or condition (the disaster, response, recovery, and disaster cycle). Thus, the value of adaptation: communities must more aggressively adapt themselves for the changes that are coming, as detailed in many of the studies cited in the report and those to come. Over the past several decades, the focus of climate-related actions has been on mitigation, the reduction in greenhouse gas emissions. However, recently increasing attention has been given to adaptation in anticipation of inevitable climate risks. We will need to protect cities, farms, and coastlines from the weather and climate hazards.

But the report states that only about one-third of countries have undertaken steps to monitor and evaluate adaptation efforts and fewer than half of these are reporting on implementation. Also, most adaptation actions have been incremental, meaning they only modify existing systems. In contrast, transformational adaptation “changes the fundamental attributes of a social-ecological system”. This relates to a discussion of current adaptive limits because in some cases, we will have to start from scratch.

Nevertheless, planning for adaptation is now widespread, although implementation has not always followed. Finding the money and resources to mitigate and adapt to climate change has always been a challenge, as there has been and will always be a substantial number of other worthy issues to address. The authors note in the report that “there has been a continued heavy imbalance” in favor of mitigation finance, with adaptation receiving only about five percent of tracked climate finance, “around \$30bn (compared to \$532bn for mitigation)”. Although this is slowly changing, it remains very tilted toward mitigation.

Avoiding projected catastrophes “would require substantial and sustained reductions of greenhouse gas emissions” IPCC scientists wrote in August’s report. The IPCC authors detail how progress on adaptation “has been observed across all sectors and regions, generating multiple benefits.”

The report is clear that an associated aspect of dealing with this problem will be, if not already is, global inequity, across continents and generations. The chasm between rich and poor may even become wider, being hard for all communities to withstand the intensifying costs. For example, roughly 80 percent of those at risk of hunger in the worst-case warming scenarios will live in Asia and Africa. The differences in vulnerability around the globe are also striking. Also, today’s youth may see a fivefold increase in extreme events if the world warms 3°C by the end of the

century, the IPCC reports. These inequities should be kept in mind in the entire planning and risk management processes.

Even though many have been aware of these climate risks, current adaptation efforts have been “uneven” and “there are increasing gaps between action taken and what is needed to deal with increasing risks.” Too often, the authors say, the responses to such risks as rising seas, extreme heat and other climate-related events and conditions have been reactive and small in scale, in contrast to the far-reaching measures that are warranted. There will definitely be a need to increasingly focus on adaptation, even if radical mitigation measures are implemented, because CO₂ and other greenhouse gases remain in the atmosphere so long.

In many areas, the report says, the capacity for adaptation may be or may become limited, with “hard limits” on its ability to cope, e.g., temperature and humidity levels too hot to tolerate and droughts so intense that even genetically modified crops may not be able to withstand water shortages.

The IPCC report contains devastating details about the potential toll ahead if we do not act appropriately and begin to anticipate. Although many environmentalists were cheered during the lockdown of 2020 with a drop in emissions, even this temporary drop did not result in a reduction in these gases in the atmosphere; the near-term prospects do not look favorable.

The difference between 1.5°C and 2°C of temperature rise from pre-industrial levels, the report states, would mean an additional 65 million people will be exposed to “exceptionally” extreme heat waves every five years (we are already at about 1.1°C change. And in the worst-case warming scenarios, projections given in the report show an additional 9 million annual deaths from climate-related illnesses by 2100, compared to the period from 1961 to 1990. Between 3.3 billion and 3.6 billion people — more than 40% of the world’s population — live in places and in situations “highly vulnerable to climate change”.

Increasing weather and climate extreme events and conditions “have exposed millions of people to acute food insecurity and reduced water security”, with the most significant impacts seen in parts of Africa, Asia, Central and South America, small islands, and the Arctic. Increased urbanization around the globe has exacerbated extreme heat (urban heat island effects) and its consequences, especially to low-income communities, children, the elderly, the disabled and ethnic minorities, already vulnerable as a result of poverty, political or social exclusion. Street trees, green roofs, green walls, and other urban vegetation are among the strategies the report lists that can reduce extreme urban heat by cooling private and public spaces. In addition, biodiversity may be threatened.

The full report includes 18 chapters – seven dedicated to each of the continents, with “small islands” instead of Antarctica, and seven cross-chapter papers addressing (1) biodiversity hotspots, (2) cities and settlements by the sea, (3) deserts, semi-arid areas, and desertification, (4) mountains, (5) polar regions, and (6) tropical forests. The assessment is based on five shared socio-economic pathways: sustainability, middle-of-the-road, regional rivalry, inequality, and fossil fuel development, each varying by degree of radiative forcing (scenarios).

For example, the report states that climate change is already affecting all dimensions of food security: availability, access, utilization (food quality and safety) and stability. In addition, social inequalities, such as gender, socioeconomic status, and ethnicity, “can compound vulnerability” to the adverse effects of climate change for both producers and consumers. Many sections of the report deal with the effectiveness of “nature-based solutions” in climate change adaptation and mitigation.

Beyond 2040 and depending on the level of global warming, climate change will lead to numerous risks to natural and human systems. For 127 identified key risks, “assessed mid- and long-term impacts are up to multiple times higher than currently observed. The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions, and projected adverse impacts and related losses and damages escalate with every increment of global warming.”

The IPCC authors project that by 2050, an extra 250,000 deaths each year from “climate-sensitive diseases and conditions” will be “attributable to climate change” (under a mid-emission scenario, compared to the 1961-1991 average). It states that these excess deaths will be dominated by heat deaths in Asia and high-income countries, childhood undernutrition and diarrheal disease in Africa and Asia and malaria³ in Africa. Overall, more than half the excess mortality will be seen in Africa.

As every actuary knows, reliable data and information regarding a problem is crucial to encourage attention and investments in solutions. However, monitoring and evaluation of adaptation projects remain a blind spot, which needs to be enhanced.

COVID-19 shows “the interconnected and compound nature of risks, vulnerabilities, and responses to emergencies”. The urgency and escalating toll of climate change has never been clearer, even as we have experienced more than two years of a severe global pandemic. A one-size-fits-all approach won’t work. For example, the report indicates that a half a billion people, mostly in medium or high latitudes, live in places that are now wetter than wet years were in the 20th century, while 160 million people live in low latitudes where the reverse is true.

Although much of the IPCC report is devoted to describing potential consequences to climate change losses and damages, its overarching message is not one of hopelessness, but urgency. If you are interested in this issue (which I assume if you have reached this point in this summary), I strongly suggest at least a quick read of the Technical Supplement, if not a skim of the parts of the full report that interest you most.

THE SEC’S “THE ENHANCEMENT AND STANDARDIZATION OF CLIMATE-RELATED DISCLOSURES FOR INVESTORS”

Sam Gutterman, FSA

On March 21, 2022, the Securities and Exchange Commission issued a 506 page [proposal](#) for mandatory disclosure of climate risks on a mandatory basis for all publicly traded companies. This proposal addresses the greenhouse gas emissions an entity produces and how climate risk affects its businesses.

The proposed regulation covers estimates of the impacts of both physical and transition (e.g., decarbonization) risks resulting from climate change. Companies would have to provide explanations about their long-term vulnerabilities to climate change and their processes for addressing those concerns. They would also be required to lay out their transition plans for managing climate risk, how they intend to meet their climate goals, progress made to minimize their exposure to these risks, and the impact of severe weather events on their finances.

In describing what is covered, the SEC distinguishes the following categories of greenhouse gas emissions⁴ :

- Scope 1: Direct greenhouse gas emissions.
- Scope 2: Indirect greenhouse gas emissions from purchased electricity and other forms of energy.
- Scope 3: Indirect emissions from upstream and downstream activities in the company’s value chain.

³ Although I hope that the recent malarial vaccine breakthrough will reduce the size of this source of excess deaths.

⁴ A discussion is included in: https://assets.bbhub.io/company/sites/60/2021/07/2021-Metrics_Targets_Guidance-1.pdf

This required disclosure information is to be included in SEC filings by all public companies such as annual reports would include Scope 1 and 2 emissions. Scope 3 cost information would only be required of large, accelerated filers.

In its fact sheet, the SEC says the new requirements would be phased in over several years, giving smaller companies more time to comply. The largest companies would need to start disclosing climate risks in fiscal 2023, while other firms would have until fiscal 2024. Companies will get an extra year beyond those dates to include supplier and customer emissions (Scope 3 emissions) and to get emissions data verified.

Hundreds of companies have pledged to cut their carbon footprints to help limit climate change. Under the proposed regulation, larger companies will have to disclose their emissions, including often hard-to-measure data from their suppliers and customers (Scope 3 emissions) only if the amount of those greenhouse gasses is material, significant to investors, or if companies outline specific targets for them. The basis for Scope 3 emission disclosure is that when, for example, a company publishes a net-zero plan, it is making a material statement about the future of its business and how its target will be reached; this must be disclosed, as it may be or become a significant risk to the entity. Although the safe harbor provision included may offer protection from litigation risk on certain elements, the results will have to be verified.

Such disclosure is not totally new to public U.S. entities—the SEC issued voluntary guidance in 2010; but this is the first time that mandatory disclosure rules have been formally put forward. Its genesis arose from the concern that risk information being made available to investors was not consistent, neither across industries nor across companies—uniform required information will more likely enable investors to effectively assess the company’s exposures, as well as to enhance its management of the effects of these risks on the entity’s operations and products. The new disclosures could reveal which companies lag their industries in cutting carbon emissions, leaving them more vulnerable to pressure campaigns from investors and the public.

An important part of the proposal is the method of verification. The year after initial requirements go into effect, verification by a qualified verifier will be required. The verifier has to be independent but does not have to be an audit firm. In any case, the verifier has to be suitably qualified to perform such verification. For two years, only limited assurance is required—then reasonable assurance is required, the latter of which is similar to an audit of the entity’s financial statements. The difference between these two is the degree of controls over the preparation of the estimates involved. *My expectation is that, if implemented, practice in this area will evolve quickly as a result.*

The content of the information provided leverages the recommendations included in the Task Force on Climate-Related Financial Disclosures (TCFD) framework^{5 6}. Another requirement is that if a company uses an internal price on carbon, it would need to share information about this price and how it is set.

Other countries have already implemented climate disclosure rules in line with the TCFD recommendations. At present, climate data disclosure ranges from voluntary in the United States, to mandatory in France, to a comply-or-explain approach in Australia. Britain and Japan plan to require certain large entities to disclose their emissions shortly, while the European Union is set to mandate all large companies listed on European stock exchanges to report their emissions beginning in 2024. Brazil, Hong Kong, New Zealand, Singapore, Switzerland, and [Canada](#) also require, or are in the process of requiring, mandatory climate risk reporting .

⁵ See the SOA Research Institute’s “The Task Force on Climate-related Financial Disclosures (TCFD) What Actuaries Need to Know” (<https://www.soa.org/globalassets/assets/files/resources/research-report/2020/task-force-climate-financial.pdf>)

⁶ See the SOA Research Institute’s current best practice in “TCFD Best Practices” (<https://www.soa.org/globalassets/assets/files/resources/research-report/2022/tcf-best-practices.pdf>)

The SEC has provided a 60-day comment period for this proposal and is expected to issue a final version later this year. Extensive comments are expected. Although the requirements are complicated and extensive, you may want to take a look at the SEC's 3-page [fact sheet](#) regarding it. Because of its complex nature, this article is only a brief outline of the proposal and should not be relied upon in any way.

A concern has been raised that the resulting disclosures will be cumbersome and costly. It looks likely that lawsuits against the SEC will emerge once the revised version is adopted. It is unknown what will happen as a result. So, stay tuned for further developments in the area of environmental disclosure.

INTERNATIONAL DEVELOPMENTS: THE INTERNATIONAL SUSTAINABILITY STANDARDS BOARD (ISSB)

Sam Gutterman, FSA

In November 2021, the IFRS Foundation Trustees announced the creation of a new standard-setting board—the International Sustainability Standards Board (ISSB)—to help meet the demand for high quality, transparent, reliable, and comparable reporting by companies on climate and other environmental, social and governance (ESG) matters. It is hoped that this will help enable investors make more informed financial decisions. There will be a 120-day consultation period.

On March 31, 2022, the ISSB launched a consultation on its first two proposed standards that address: (1) [general sustainability-related disclosure requirements](#) and (2) [climate-related disclosure requirements](#). A 16-page snapshot is provided as well.

As in the SEC proposed regulation, a contentious issue is the treatment of Scope 3 emissions, which come from an entity's suppliers and customers. For many financial institutions, these emissions would be linked to their loans and investments.

Similar to the SEC's proposed disclosure requirements, these two proposed standards are generally based on the TCFD's framework. In addition, they are also built on the work of the Climate Disclosure Standards Board, the International Accounting Standards Board, the Value Reporting Foundation (which houses Integrated Reporting and SASB Standards), and the World Economic Forum.

Additional thoughts:

IPCC FACTSHEETS AND ARTICLES IN NEWS

These *IPCC Factsheets* and section are a good way to get a quick snapshot of the key findings of the IPCC WG II Sixth Assessment Report. Each of these follow the structure presented in the Summary for Policymakers ('SPM') where the findings are grouped under three segments i) Climate change impacts and risks, ii) Adaptation options and barriers and iii) Climate resilient development.

<https://www.ipcc.ch/report/ar6/wg2/about/factsheets>

IPCC provided; Overarching Frequently Asked questions (FAQs) is another...

<https://www.ipcc.ch/report/ar6/wg2/about/frequently-asked-questions>

Articles in News

<https://www.wri.org/insights/ipcc-report-2022-climate-impacts-adaptation-vulnerability>

<https://www.vox.com/22951182/climate-change-report-ipcc-un-adaptation-warming>

https://www.c40knowledgehub.org/s/article/Climate-Change-2022-Impacts-Adaptation-and-Vulnerability-AR6-WGII-IPCC?language=en_US

<https://www.carbonbrief.org/in-depth-qa-the-ipccs-sixth-assessment-on-how-climate-change-impacts-the-world>

WEBINARS/PODCASTS

Here you will find some interesting recordings of the webinars that took place after the release of the IPCC WG II Report throughout the month of March. Some of them include scientists who were involved in the review process and the development of this report. The benefit that I found of these recording is two-fold, not only did I get a good overview of the content of the report but also a preview of the key infographics to focus in the report along with the narrative and the findings embedded in them.

Following is the recording of the *IPCC's press conference* presenting the report and the scientific findings related to it. <https://www.youtube.com/watch?v=VKhoVnC3lNk>

The following is by *The Center for Climate and Security, Washington DC*. *This panel discussion highlights the key takeaways from the IPCC report for the security community—connecting the dots between the science and the concrete actions security actors will need to take to prepare for the effects of climate change.*

<https://www.youtube.com/watch?v=9sE4EJ1EteU>

The following two are by *The Climate Pod* the first one provides a bird-s-eye view of the report and the second one is an interview of Dr JÖRN BIRKMANN, also the co-author of Chapter 18 (Climate Resilient Development)

<https://www.youtube.com/watch?v=tc...F-fNgZlLU>

<https://www.youtube.com/watch?v=fErMRbM9c2c>

UK Climate resilient Program – Conducted a two-part webinar on IPCC WGII report and more.

Part 1: Daniela Schmidt and Mike Morecroft present their work as Coordinating Lead Authors on Chapter 13 (Europe) and Chapter 2 (Terrestrial and Freshwater ecosystems Natural England), respectively.

<https://www.youtube.com/watch?v=swOfL6tQTE4>

Part 2: Lea Berrang Ford presents Chapter 16 (Key risks across sectors and regions), and Diana Reckien focuses on Chapter 17 (Decision making options for managing risk)

<https://www.youtube.com/watch?v=yUtuJKgcZ9o>

Researchers Desk – A presentation by Co-Ordinating Lead Author of Chapter 18 (Climate Resilient, IPCC WGII, Lisa Schipper.

<https://www.youtube.com/watch?v=lQUOERSU9No&t=176s>

Not to be missed - IAA's Recent Release

CLIMATE SCIENCE: A SUMMARY FOR ACTUARIES

The International Actuarial Association (IAA) on March 18th, announced the publication of ***Climate Science: A Summary for Actuaries***. The text below is from the IAA report release.

*On 16 March 2022, the International Actuarial Association (IAA) announced the publication of [Climate Science: A Summary for Actuaries](#), prepared by the IAA's Executive Committee's Climate Risk Task Force in association with the United Nations Intergovernmental Panel on Climate Change (IPCC) Working Group I Technical Support Unit. **This Summary, based on the IPCC Working Group I Sixth Assessment Report released in August 2021, is tailored to the actuarial community to provide helpful insights into what the IPCC report means for the Actuarial profession.***

Actuaries, as risk professionals, need to understand the physical impacts of climate systems and climate changes. Such impacts will affect how risks are underwritten, priced, managed, and reported, whether for general, life or health insurance, pensions, other financial institutions, or social security. It is important for actuaries to understand the magnitude of the potential changes, the uncertainty of their frequency and intensity, and the inherent volatility of such risks.

Additionally, the IAA is having a webinar on what the IPCC report means for the actuarial profession, on April 13. You can get to the registration page for the webinar by following this link [Climate Issues \(actuaries.org\)](https://www.actuaries.org/climate-issues)

About the Society of Actuaries Research Institute

Serving as the research arm of the Society of Actuaries (SOA), the SOA Research Institute provides objective, data-driven research bringing together tried and true practices and future-focused approaches to address societal challenges and your business needs. The Institute provides trusted knowledge, extensive experience and new technologies to help effectively identify, predict and manage risks.

Representing the thousands of actuaries who help conduct critical research, the SOA Research Institute provides clarity and solutions on risks and societal challenges. The Institute actuaries, academics, employers, the insurance industry, regulators, research partners, foundations and research institutions, sponsors and non-governmental organizations, building an effective network which provides support, knowledge and expertise regarding the management of risk to benefit the industry and the public.

Managed by experienced actuaries and research experts from a broad range of industries, the SOA Research Institute creates, funds, develops and distributes research to elevate actuaries as leaders in measuring and managing risk. These efforts include studies, essay collections, webcasts, research papers, survey reports, and original research on topics impacting society.

Harnessing its peer-reviewed research, leading-edge technologies, new data tools and innovative practices, the Institute seeks to understand the underlying causes of risk and the possible outcomes. The Institute develops objective research spanning a variety of topics with its [strategic research programs](#): aging and retirement; actuarial innovation and technology; mortality and longevity; diversity, equity and inclusion; health care cost trends; and catastrophe and climate risk. The Institute has a large volume of [topical research available](#), including an expanding collection of international and market-specific research, experience studies, models and timely research.

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