

the market tends to promote extreme consumerism in an effort to sell its products, people can easily get caught up in a whirlwind of needless buying and spending. Compulsive consumerism is one example of how the techno-economic paradigm affects individuals” (§203).

Marcuse maintained that in contrast to the dominant universe of thought that erases alternative discourses, two-dimensional thought is oppositional and allows for imagining radically different futures, something the Pope claims has become unthinkable: “The idea of promoting a different cultural paradigm ... is nowadays inconceivable.” (§108). Against the “assault of the technocratic paradigm” (§111), the encyclical pleads for a “bold cultural revolution” (§114) built on a liberating and “happy sobriety” (§224), and on care for others and Mother Earth. Here, the focus shifts away from macroprocesses and structures and onto individual “conversion” (§217) to an “ecological culture” (§111), making the encyclical’s message more ambiguous.

Giving primacy to spirituality could only be expected from a publication of the Catholic Church. But the radical

change required by the environmental crisis entails more than a new awareness. The challenge is enormous and the road ahead is unavoidably bumpy. Society needs to embark on a creative destruction and reconstruction of multiple socio-political arrangements and institutions. Long-established discourses, which appear natural and inevitable, have to be problematized and replaced. Ingrained practices have to be questioned. The encyclical itself touches on some of those thorny matters, which may involve “[imposing] restraints ... on those possessing greater resources and financial power” (§129) or “accept[ing] decreased growth in some parts of the world” (§193).

Democratizing climate politics

Truly democratic change will require making room for those 99% that dominant narratives about the politics of climate change construct as spectators of (inter) governmental negotiations while hiding their mess. The encyclical is a highly significant appeal to citizen engagement with environmental and social change. Appreciating the ecological movement’s historical role, the Pope repeatedly urges individuals and civic groups to engage with

the politics of climate change and pressure governments to develop effective measures.

In its reading of the interconnectedness of environmental and social matters and in the vision it advances, the encyclical proposes a social ecology that will hopefully inspire many to go beyond ‘green romanticism’¹⁰ and push for structural social and political transformation. □

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References

1. Arendt, H. *The Human Condition* (Univ. Chicago Press, 1958).
2. Swyngeudow, E. *Theor. Cult. Soc.*, 27, 213–232 (2010).
3. Machin, A. *Negotiating Climate Change: Radical Democracy and the Illusion of Consensus* (Zed Books, 2013).
4. Maesele, P. in *A The Routledge Handbook of Environment and Communication* (eds Hansen, A. & Cox, R.) 389–401 (Routledge, 2015).
5. Kenis, A. & Lievens, M. *The Limits of the Green Economy* (Routledge, 2014).
6. Couldry, N. *Why Voice Matters: Culture and Politics After Neoliberalism* (Sage, 2010).
7. Bond, P. *The Politics of Climate Justice* (Univ. of KwaZulu-Natal Press, 2012).
8. Marcuse, H. *One Dimensional Man: Studies in the Ideology of Advanced Industrial Society* (Beacon Press, 1964).
9. Baudrillard, J. *La Société de Consommation* (Gallimard, 1970).
10. Dryzek, J. *The Politics of the Earth: Environmental Discourses* (Oxford Univ. Press, 1997).

COMMENTARY:

Science and religion in dialogue over the global commons

Ottmar Edenhofer, Christian Flachsland and Brigitte Knopf

The Pope’s encyclical makes unprecedented progress in developing scientific dialogue with religion by drawing on research, and encouraging further discussion about the ethical challenge of governing the global commons.

In a year critical for international efforts to address climate change and sustainable development, Pope Francis has published an encyclical on climate change, poverty and inequality (<http://go.nature.com/7IbiB5>). It is the first time in the history of the Roman Catholic Church that a Pope has addressed an encyclical not only to all Roman Catholics or to “all people of good will”, but also to all “people living on planet Earth”. Pope Francis’ call for a global dialogue on the twenty-first-century challenges of climate change, poverty and inequality has resonated with scientific communities

in particular, with major journals such as *Nature* and *Science* dedicating editorials to the subject^{1,2}. This is unprecedented in the Western history of dialogue between religion and science.

Since enlightenment, the relationship between science and religion has generally been characterized by conflict rather than cooperation. Religion has struggled to identify a division of labour on questions related to cosmology, evolutionary theory, socio-biology, economics or reproductive medicine. In this struggle, it can be said that religion has been losing epistemic

authority to science in one territory after another. Perhaps the most striking aspect of the encyclical is that Pope Francis seems unwilling to continue this conflict — instead, he chooses to embrace science while pointing out that ethical questions cannot be resolved by science alone. He asks for a dialogue between religion and science to meet the fundamental global challenges that mankind is collectively facing.

As its starting point, the encyclical adopts the scientific finding of the anthropogenic causes of climate change as established by Working Group I of the

IPCC. Without explicitly citing the IPCC, the encyclical recognizes the human risks from the impacts of climate change, which are summarized in the Working Group II report.

The encyclical puts particular emphasis on the risks of climate impacts for the poor, which include reduced productivity of agriculture, increasing water scarcity, rising sea levels, and increasing intensity and frequency of extreme weather events. The Pope is also concerned about other adverse global environmental challenges, such as air pollution, the loss of biodiversity and increasingly limited access to clean water. He fears that climate change and other environmental pressures will force the poor to migrate and that critical resource depletion might even lead to wars (§25, 57).

The position of climate ‘contrarians’ is also clearly refuted (§54, 135, 188) and identified as being driven by economic and ideological interests, echoing the analyses of the “merchants of doubt” by Eric Conway and Harvard historian of science Naomi Oreskes³.

Building on scientific consensus about the physics and impacts of climate change, the encyclical also reflects mainstream social scientific analyses on responses to climate change. In particular, the encyclical suggests that the twin challenges of climate change and poverty need to be tackled together and cannot be prioritized over each other. As succinctly put by economist Nicholas Stern: “If we fail on one, we fail on the other”⁴.

Other social scientists have similarly argued that the impacts of climate change threaten to eclipse any progress made in eradicating poverty in the mid- and long-term, and that without attractive low-carbon development pathways, poor societies will refuse to maintain low emissions levels or to reduce them further⁵. The Pope’s encyclical endorses this view.

Global commons

If the poor are going to be protected from the impacts of climate change, emissions must be limited. Although the encyclical does not discuss specific stabilization objectives, the international community has established an objective to limit the increase of global warming to 2 °C above pre-industrial levels, which corresponds to limiting future cumulative CO₂ emissions to roughly 1,000 Gt (ref. 6). Access to the global atmospheric sink for depositing CO₂ has historically been open to all, however, and in most regions today this is still the case. The encyclical criticizes the resulting overconsumption, in particular by the global rich. To protect the poor from the adverse impacts of climate change, Pope Francis



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asks the world’s community to establish an effective governance regime for the climate by declaring it “a common good, by all and for all” (§23, 174)

Economic analyses have shown that limiting the use of the atmospheric carbon sink would have significant consequences for the global distribution of wealth⁷. Fossil fuel resources are estimated at about 15,000 Gt CO₂. Even with the use of carbon capture and storage (CCS) technology, achieving the 2 °C objective would require the majority of fossil resources to remain unutilized. This would devalue the assets of fossil fuel resource owners⁸. In this conflict between the interests of the poor and those of fossil fuel resource owners, the Pope weighs in for the former.

The Pope’s framing of the climate as a global common good bears striking resemblance with the IPCC Working Group III approach to climate change in its most recent Fifth Assessment Report⁹. Similarly striking was the reaction of government delegates to this concept during the final approval session of the IPCC Working Group III report in 2014, where the Summary for Policymakers (SPM) was negotiated between governments and scientists. Several governments strongly opposed any language defining climate change as a global commons problem. The underlying Working Group III report remained unchanged, but in the final version of the SPM the reference to the term “global commons” was relegated to a footnote. The accompanying text in the footnote tellingly reveals the concerns

of some governments over the potential juridical implications of declaring the climate a global commons: “...it has no specific implications for legal arrangements or for particular criteria regarding effort sharing.”

Elevating the status of the climate to a global commons would entail protecting the poor from climate change and a fair global sharing of the costs of mitigation, in particular by richer societies that are capable of doing so. This is an idea that some governments are obviously not keen to endorse, but which the Pope’s encyclical puts prominently on the table.

Another striking resemblance between the IPCC Working Group III report and the encyclical concerns the consideration of political approaches to mitigating climate change. Both documents put particular emphasis on polycentric approaches to climate governance, a concept promoted by Nobel Laureate Elinor Ostrom¹⁰, to whom the Working Group III report is dedicated. According to this concept, international cooperation via the United Nations Framework Convention on Climate Change (UNFCCC), national and sub-national public policies, as well as private business, civil society and individual efforts to tackle climate change, should act in tandem and as complements to one another, not substitutes.

Moral authority and applied policy

Not all statements in the encyclical have been endorsed by the scientific community. In particular, the encyclical (§171) is concerned about the effectiveness of emission trading as a policy instrument — an analysis that some environmental economists disagree with. Also, the suggestion of using economic de-growth as a tool for mitigating climate change (§193) does not resonate well with economists. However, researchers should note that, unlike fundamental moral considerations, the encyclical does not claim particular authority on questions of applied policy analysis; the Pope’s concerns might rather be considered as an invitation to discuss them in light of deeper ethical concerns.

The Pope asks for a fundamental dialogue between religions and science (§199–201) on the responsible use of the powers conveyed to mankind by modern technology. Citing the philosopher Romano Guardini¹¹, the encyclical emphasizes that modern technology bears an immense potential for improving the world if guided by ethical behaviour. Without deliberate and responsible design of technological systems, however, there is a risk not only of global environmental problems such as climate change, but also many other forms of human

deprivation. This analysis resonates with discussions of the use of instrumental reason in modernity in the traditions of Max Weber and sociological critical theory^{12,13}, even though the encyclical does not explicitly refer to these.

Reminiscent of the general tenet of the work by Elinor Ostrom, the central message conveyed by the encyclical is that mankind is not fatally trapped in an inescapable tragedy of the global commons. Rather, the Pope calls for a dialogue among “all people living on this planet” to turn the alleged tragedy of the commons into a drama, in which different forces struggle but eventually make progress towards achieving the common good for all.

A dialogue between science, religions and different worldviews can lead to an enhanced and mutual understanding of the common challenges that mankind is facing. This can increase our freedom to choose among the

alternative future pathways on which we will collectively embark. □

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References

1. Nature 522, 391 (2015).
2. McNutt, M. Science 349, 6243 (2015).
3. Oreskes, N. & Conway, E. *Merchants of Doubt. How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (Bloomsbury, 2011).
4. Stern, N. *The Global Deal: Climate Change and the Creation of a New Era of Progress and Prosperity* (PublicAffairs, 2009).
5. Edenhofer O. et al. *Climate Change, Justice, and Sustainability: Linking Climate and Development Policy* (Springer, 2012).

6. IPCC *Climate Change 2014: Synthesis Report* (eds Pachauri, R. K. & Meyer, L. A.) (Cambridge Univ. Press, 2014).
7. Edenhofer, O., Flachsland, C., Jakob, M. & Lessmann K. in *The Handbook on the Macroeconomics of Climate Change* (eds Semmler, W. & Bernard, L.) 260–296 (Oxford Univ. Press, 2014).
8. Bauer, N. et al. *Climatic Change* <http://dx.doi.org/10.1007/s10584-013-0901-6> (2013).
9. IPCC *Climate Change 2014: Mitigation of Climate Change*. (eds Edenhofer, O. et al.) (Cambridge Univ. Press, 2014).
10. Ostrom, E. *Econ. Theory* 49, 353–369 (2012).
11. Guardini, R. *The End of the Modern World* (ISI Books, 2001).
12. Weber, M. *The Protestant Ethic and the Spirit of Capitalism* (Angelico, 2014).
13. Habermas, J. *The Theory of Communicative Action* (Beacon, 1985).

Author contributions

The three authors cooperate on a daily basis. They have not achieved an agreement on all relevant metaphysical claims and ethical judgements because one is Catholic and an economist, one is Protestant and a social scientist, and one is an atheist and a natural scientist. They agree at least on this text.

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COMMENTARY:

New leadership for a user-friendly IPCC

Arthur Petersen, Jason Blackstock and Neil Morisetti

The IPCC's new leadership needs to promote reforms to make the panel more relevant to the actors that use the organization's information.

The information needs of decision-makers and practitioners around the world are varied and increasingly urgent. Yet, as these needs have expanded, there has been a widening gap between what most IPCC authors understand to be useful information and what decision-makers see as informative^{1–4}.

IPCC reports command global respect and aid international climate negotiations. They have driven political consensus about the reality and risks of climate change over the past quarter century. But the focus of the climate conversation is rapidly changing. Most decisions on climate mitigation and adaptation are now widely distributed, with actors wrangling localized social, economic, business, ecological and political concerns.

While the “generic, untailored and untargeted”⁵ climate knowledge historically communicated by the IPCC has been effective for international political dialogue, it is not fit for the purpose of supporting

distributed climate action in the coming decades. Despite the IPCC's influence on climate change knowledge, discourse about climate change, and climate policy development, there are significant obstacles to the use of this knowledge by those that urgently need to make decisions⁵.

While the IPCC is not (and will never be) able to satisfy all information needs, there are ways to enhance the relevance of its processes, and enable scientifically credible actors to deliver user-focused scientific assessments on climate change. Here, we outline a number of ways the new IPCC leadership, elected in October 2015, can help the organization become more relevant.

Reforms

The Task Group on the Future Work of the IPCC was established at a plenary session in Batumi, Georgia, in October 2013⁶. Participants in an independent workshop

on reforms, held in February 2014 at University College London, came from IPCC member governments, the Executive Committee, intergovernmental organizations, national government departments, city governments, business and non-governmental organizations⁷. The outcomes of that workshop were presented at the first meeting of the task group in Berlin in April 2014.

Here we summarize the main recommendations for a possible evolution of the IPCC, which have as yet only partly been taken up in the Decision on Future Work of the IPCC of February 2015⁸.

Good practice. There is a need to improve the way IPCC data and findings are used by actors at national and subnational levels. The IPCC could extend its methodological work for this purpose. In particular, it could partner with academic institutions to provide training in climate