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Viewpoint

Key Principles for the Intergovernmental Science−Policy Panel on Chemicals and Waste

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INTRODUCTION

In 2021, the United Nations Environment Programme (UNEP) recognized chemical pollution as a planetary crisis tantamount to climate change and biodiversity decline.[1] In an important next step, the international community agreed in March 2022 on establishing an independent, intergovernmental science−policy panel on chemicals, waste, and pollution prevention (hereafter termed "the Panel").[2] This Panel will take its place among two other intergovernmental bodies, the Intergovernmental Panel on Climate Change (IPCC)[3] and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).[4] Now is a crucial time for establishing the Panel, following a process facilitated by UNEP to negotiate the Panel's scope, functions, and institutional design, with the ambition to formally establish the Panel in 2024.

As a group of international scientists working on chemical pollution, we applaud this milestone of progress to initiate the establishment of a panel for chemicals, waste, and pollution prevention. At the beginning of the negotiating process, we would like to highlight the following 10 critical aspects for consideration in determining the settings of the Panel.

1. Why a New Panel? The new Panel is needed to fill a critical gap pertaining to the mounting and accelerating impacts on human and environmental health caused by chemical pollution and waste globally. The highly multifaceted and heterogeneous impacts of chemical pollution encompass a wide array of issues that often show dynamic development and require international action.[5] Therefore, there is an urgent need for a big-picture perspective resulting from a comprehensive and ongoing horizon scanning, monitoring, interpretation of data, and synthesis of individual findings. This goes beyond the remit of existing bodies at the national, regional, and international levels because their scopes and mandates are limited to certain chemicals, geographical areas, or jurisdictions (examples here include the Basel, Stockholm, Rotterdam, and Minamata conventions). For the development of effective action at the global level, comprehensive and authoritative scientific assessments are crucial.

2. Avoid Paralysis by Analysis. Current knowledge is sufficient for several chemicals or groups of chemicals with hazardous properties (for example, lead, mercury, asbestos, and several pesticides) to enable implementing evidence-based solutions. As an integrator of scientific information, the Panel must avoid "paralysis by analysis" by repeatedly re-assessing the same topics and substances. The reports "Late lessons from early warnings I & II"[6,7] provide a wide range of examples (e.g., benzene, DDT, mercury, lead, asbestos, and PCBs) where continued research expanded and deepened the understanding of the issue but largely confirmed earlier insights and where, accordingly, action could and should have been taken earlier. Also, knowledge of the proper treatment of many types of waste is available, which helps to reduce and ideally prevent the spread of many pollutants into the environment. The Panel should therefore provide a comprehensive bigger picture and forward-thinking reviews and assessments to enable horizon scanning in order to identify new research gaps and needs, also for more recently identified "emerging" issues.

3. Scope. The Panel's work needs to be broad and inclusive to properly respond to the breadth and complexity of global chemical production, use, releases, and disposal, involving up to several hundred thousand chemicals, of which a substantial fraction is hazardous to humans and/or ecosystem health. This includes well-characterized "legacy" chemicals, but also a much

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larger array of "chemicals of emerging concern" and novel waste streams such as non-agricultural biocides, per- and polyfluoroalkyl substances (PFAS), pharmaceuticals; personal care products, toxic metal(loid)s, rare-earth elements, and other chemicals being used in growing renewable energy and digital technology industries.[8] In addition to understanding the impact of the use of single substances, effects from mixtures also need to be considered.[9] Also to be addressed are the numerous (and often insufficiently known) impurities in the produced chemicals and the even larger array of (potential) chemical contaminants resulting from abiotic and biotic environmental transformation processes.[10]

4. Tasks and Outputs. As with other science−policy bodies, the Panel should be policy-relevant but not policy-prescriptive in providing integration and analyses that support sound, evidence-based policy development. Early warning of new and emerging chemical contamination issues, including the analysis of options for policy actions, should be among the regular tasks for the Panel. The Panel should inform, and provide feedback to, policymakers, especially in national and multinational jurisdictions and regulatory bodies, about important scientific gaps and findings and also inform the scientific community about policy-relevant scientific questions. Chemical hazard and risk assessments are performed by existing bodies, and while these processes could be improved, assessments of individual chemicals should not be the primary focus of the Panel. Rather, the Panel should address strategically important and broader issues. These issues may include the identification and assessment of chemical groups of concern (see above), effective strategies for avoiding regrettable substitution, etc.

5. Roles of Different Actors. The models of IPCC and IPBES should inspire and inform the Panel in terms of the roles and responsibilities of various societal actors and groups contributing to its work. Governments should nominate independent experts as the main "workforce" of the Panel. Independent scientists will provide primary scientific results; independent scientists can also facilitate the appropriate use of the assessments of the Panel. Also, national and international government scientists should be included as independent experts. However, while government scientists are free to publish scientific findings in the peer-reviewed literature, they may not be permitted to comment on or contradict existing government policies on chemicals, specifically if there is divergence or conflict of opinion. Other actors such as intergovernmental organizations, environmental nongovernmental organizations, civil society groups, community-based organizations, and the private sector should act as observers and be invited to provide input.

6. Conflicts of Interest. The Panel needs to establish and enforce a strict conflict-of-interest policy. In particular, it must be recognized that, while the private sector might be privy to important information, its representatives may also have inherent conflicts of interest. Research shows that systematic strategies for influencing, and in some cases discrediting, both the science and the subsequent policy development have been used by industries manufacturing tobacco, coal, sugar, oil, and chemicals.[11] This need for a clear conflict-of-interest statement also applies to those who act through nongovernmental bodies such as multisector associations. All experts contributing to the work of the Panel must declare their conflicts of interest, financial and otherwise.

7. Data. Following IPCC and IPBES, a range of data from the peer-reviewed scientific literature, gray literature, and existing biological and chemical monitoring programs will be foundational for the outcomes of the Panel. This highlights the importance for the Panel to make use of all available reliable and relevant data and not to limit itself to prescribed data formats such as those defined by specific test guidelines or good laboratory practice (GLP), as such a limitation may exclude studies of significance, especially from all geographic areas. Studies from the scientific literature have proven to be valuable in the restriction of chemicals under the EU chemicals regulation, REACH, meaning that these studies were considered of sufficient reliability and relevance.[12] As a model, the new Transparency Regulation in the European Union's food laws is also expected to open up previously unavailable data for use in other domains of chemical oversight in the EU and beyond. Transparency of data and the Panel's workflow is crucial. Furthermore, the inclusion of under-resourced countries or regions in mobilizing data (digitized and undigitized) should be fostered.

8. Establish Inclusive Knowledge Exchange. The production, use, and disposal of chemicals are important parts of human activities across the globe. However, different countries and regions approach the management of hazardous chemicals and waste in different ways, driven by different government political climates, economic systems, and state capacity, as well as different geographical and ecological conditions. It will therefore be critical that the Panel apply a transdisciplinary approach to the integration of knowledge, across different temporal and spatial scales and different regions of the world. The ability of the Panel to provide useful options for improving the management of chemicals and waste will depend on an integration of natural and biomedical sciences [e.g., chemistry, exposure sciences, (eco)toxicology, ecology, epidemiology, and risk assessment], social sciences (e.g., economics, political sciences, communication sciences, and law), humanities, traditional and local indigenous knowledge, and other knowledge sources. The adequate involvement of experts in risk communication will be critical for the dissemination and contextualization of the Panel's work.

9. Work Program and Uptake of Results. The Panel has the potential to contribute objective, authoritative, and current syntheses of information for countries to utilize as they develop national and international policies. The work of the Panel will provide a new and valuable resource from which information can be drawn and from which suggestions for future actions can be developed. Again, we emphasize that the outcomes of the Panel will be policy-relevant, but not policy-prescriptive, and the actual way forward will be decided by political processes at national, regional, and international levels that feed into the intergovernmental process.

10. Global Representation and Participation. The Panel needs to ensure that all countries are adequately represented in terms of experts and their backgrounds, data, and access to information. The Panel should operate on a global scale to identify and address critical needs in terms of both information and capacity. One key task of the Panel is to address the limitation that currently available data and expertise are centered on high-income countries, even though the majority of pollution-related impacts and deaths occur in low- and middle-income countries. The Panel should recognize that these countries, broadly defined as the "Global South",

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have a critical but poorly recognized role in the production of chemicals and handling of chemical waste and carry a substantial part of the burden from chemical pollution, while at the same time being global biodiversity hotspots.

JOIN THE PROCESS

Academic scientists around the world will play a crucial role in the work of the Panel. The time to prepare the ground for this important task is now, by providing input to the political process defining the setup of the Panel. We encourage scientists from all countries to join the discussion, indicate their interest in the Panel's work, identify urgent chemical pollution and waste issues in their regions, and share their insights with fellow scientists as well as policymakers nationally and internationally.

An Open-Ended Working Group (OEWG) has been established under UNEP as the venue where the scope, function, and structure of the Panel are being discussed and, eventually, will be decided.[13] Decisions will be made by governments; nongovernmental stakeholders can be accredited as observers to contribute to the discussion. Academic scientists can join this process through several avenues. One is by being nominated as a member of their government's delegation. This will be an important role for scientists to play but will be limited to a relatively small number of scientists per country.

Another possibility is through accredited nongovernmental organizations (NGOs). However, many of these organizations may have specific mandates that do not necessarily reflect, or are even in contradiction with, the role of independent scientists. Therefore, there is a need for organizations that fulfill the requirements for accreditation (most importantly, nongovernmental, not-for-profit status, engagement in the field of environment, and international scope) and that can offer a platform for academic scientists to present their contributions to the discussion. This function may be fulfilled by scientific societies such as the Royal Society of Chemistry (RSC), the Society of Environmental Toxicology and Chemistry (SETAC), the Endocrine Society, and others. An example of an organization that specifically and exclusively represents academic scientists is the International Panel on Chemical Pollution (IPCP).

Finally, academic institutions may also be accredited with UNEP, which would facilitate participation of their faculty members. However, very few universities have so far applied for accreditation, and it is not yet fully clear under which circumstances universities fulfill the status of "nongovernmental". According to UNEP, applications from academic institutions are welcome, also to further clarify the accreditation process for universities.[14,15]

The development of the Panel represents an important step forward. It recognizes the global nature and the complexity of chemicals and waste issues. The Panel will provide the much-needed forum for comprehensively addressing these challenges.

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Notes

The authors declare no competing financial interest.

Biography

Dr. Martin Scheringer is a professor of environmental chemistry at RECETOX, Masaryk University, Brno, Czech Republic, and a senior scientist and group leader at the Swiss Federal Institute of Technology (ETH) in Zürich, Switzerland. He has worked in the area of chemical hazard and risk assessment for more than 25 years with a focus on persistent organic pollutants and environmental long-range transport of organic chemicals. In addition to his scientific research, Martin Scheringer has worked extensively at the science–policy interface. He is a founding member of the International Panel on Chemical Pollution (IPCP) and a member of the Global PFAS Science Panel (GPSP). He was a co-author of the chapter on chemicals and waste in UNEP's 5th Global Environment Outlook (GEO-5) and has published three books and more than 250 peer-reviewed scientific publications. From 2015 to 2020, he was an Associate Editor of *Environmental Science & Technology*.

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