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Perspective

Developments in Acid Rain and Air Pollution Policy

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Abstract

Due to its devastating, broad effects on ecosystems and its transnational nature, acid rain garnered a lot of scientific and public attention at the end of the 20th century. This led to coordinated governmental actions in North America and Europe. These measures dramatically reduced air emissions and had a less detrimental effect on ecosystems, particularly those implemented under the UNECE Convention on Long-range Transboundary Air Pollution. The policy agreements were developed on the basis of in-depth scientific research, continuous observation, and integrated assessment modelling. In this study, which is based on an international symposium convened to commemorate 50 years of effective integration of air pollution research and policy, we provide a brief summary of the scientific findings that formed the foundation for the evolution of policy. These measures dramatically reduced air emissions and had a less detrimental effect on ecosystems, particularly those implemented under the UNECE Convention on Long-range Transboundary Air Pollution.

Keywords: Acid rain • Air emissions • Chemical Climatology • Pollution

Introduction

The policy agreements were built on a foundation of extensive scientific study, long-term monitoring, and integrated assessment modelling. We briefly outline the scientific results that served as the basis for the policy evolution in this paper, which is based on an international symposium held to mark 50 years of successful integration of air pollution research and policy. At the close of the 20th century, acid rain attracted considerable scientific and public attention due to its serious, widespread effects on ecosystems and its transnational nature, which prompted concerted governmental responses in North America and Europe. The policy agreements were built on a foundation of extensive scientific study, longterm monitoring, and integrated assessment modelling. We briefly outline the scientific results that served as the basis for the policy evolution in this paper, which is based on an international symposium held to mark 50 years of successful integration of air pollution research and policy. We also go through crucial aspects of the linkages between science and policy, like the idea of critical loads and extensive ecosystem field research. Finally, the backdrop of societal demands and future developments, such as the UN Sustainable Development Goals, is provided for acid rain and air pollution. We also stress the importance of preserving and expanding scientific infrastructures. During the later decades of the twentieth century, acid rain was one of the most significant environmental problems. It changed the game in terms of science and politics. Many people once believed that acid rain was one of the worst environmental hazards at the time, especially during the 1980s. Top stories in the mainstream media included reports of fish extinction in Scandinavian surface waters and forest dieback in Europe. Acid rain drew significant public and policy attention, even in North America [1]. When East and West had little to no contact during the Cold War, acid rain broke the ice and created a space for scientific and political cooperation, leading to the 1979 signing of the Convention on Long-range Transboundary Air Pollution (often referred to as CLRTAP but in this paper we refer to it as the Air Convention) under the auspices of the United Nations Economic Commission for Europe (UNECE). Eight protocols have been signed under the Air Convention, pledging parties to take extensive action in response to a number of air pollution issues, including acid rain. All major air pollutants have seen considerable reductions in emissions, and sulphur dioxide, the most significant acidifying chemical, has seen emissions in Europe drop by 80% or more since the 1980s and 1990s peak periods [2].

The discovery and early history of acid rain

The Swedish scientist Svante Oden wrote an intentionally provocative essay titled "An Insidious Chemical Warfare Among the Nations of Europe" in the Swedish newspaper Dagens Nyheter in October 1967. The article discussed the new and dangerous environmental issue of acid rain. He cited the huge pH drop in rainwater and surface waters during the past ten years and connected it to the significant and rising sulphur dioxide emissions in Europe. The Swedish government responded to the revelation right away, and a few weeks after Oden's publication, the industry minister brought up the matter at the Organization for Economic Cooperation and Development (OECD), but at that time, it garnered no political attention. Göran Persson, a Swedish delegate, raised the matter before the OECD's Air Pollution Management Committee. The message was also regarded with scepticism in this instance, and the consensus among the committee members was that sulphur dioxide was a local issue that could be easily resolved by large stacks. Persson didn't play his last card and mention the observations of transcontinental radioactive trafficking until he thought he was about to "lose the case." nuclear weapon testing. The group then concluded that acid rain might be a problem worth investigating. From this point forward, the OECD and the western world understood that air pollution might have global political implications. However, recognition of acid rain and many of its ecological repercussions predated 1967–1968. In actuality, an English chemist named Robert Angus Smith made many of the early discoveries about the acid rain phenomenon. Smith produced a thorough study on the chemistry of rain in and around Manchester, England, in 1852. Twenty years later, Smith introduced the phrase "acid rain" and many of the key concepts that now form the basis of our current understanding of this occurrence in a very thorough work titled "Air and Rain: The Beginnings of a Chemical Climatology". Unfortunately, practically every succeeding researcher largely disregarded Smith's groundbreaking book. However, neither scientists nor the general public recognized these ground-breaking contributions, as Smith did a century before. The scientific community as well as the general public responded to Gorham's discovery with what he described as a "thundering silence," much like Smith had done a century earlier. The issue of acid rain wasn't brought to the attention of the general public and scientists until Svante Oden published his meticulously researched Ecological Committee Report and his purposefully provocative piece in Dagens Nyheter in 1967 and 1968, respectively. A substantial body of scientific and policy-relevant evidence was presented in the report, showing that long-distance transport and deposition of acidifying pollutants had significant negative effects on the environment and ecosystems, even in nations that were geographically remote from pollutant-emitting source regions in other countries. "Sulphur compounds do travel long distances in the atmosphere and the air quality in any European country is substantially affected by emissions from other European countries," read the major finding of the OECD research, which was published in 1977. (OECD 1977). Even while there were still concerns about the scope of the transport, it was generally agreed that there needed to be international cooperation on the issue of transboundary air pollution transport. With the launch of the European Monitoring and Evaluation Programme (EMEP) in 1977, these findings paved the way for a Pan-European scientific collaboration on air pollution [3]. The project's conclusions also served as the foundation for the Air Convention. Since its inception, EMEP has

been a crucial component of the Convention and has made a significant contribution. The German scientist Bernhard Ulrich warned that sulphur deposition in the atmosphere posed a severe threat to European woodlands in 1980. He concluded that the soil chemistry had been significantly altered by the high deposition of air pollutants from his extensive investigations in the Solling area. Ulrich emphasised the connections between the deposition of sulphur and the emission of inorganic aluminium. His conclusions influenced policy not only in Germany but also in other countries in Europe and even North America. The alarms, which were frequently overblown, spread like wildfire via the media and altered a lot of opinions in Europe. Newspapers were flooded with images of dead trees, particularly in "The Black Triangle"—the border region between Poland, East Germany, and Czechoslovakia—where brown coal with a high sulphate content was burned extensively. Crown thinning and other effects on forests were noted in forest inventories, but it was challenging to pinpoint acid deposition as the (sole) cause of the consequences. The first worldwide agreement on emission control under the Air Convention was made possible by the growing interest in local air pollution. A "club" under the Convention was first formed by nations with a keen interest in taking action, to reduce emission by 30%. The Sulphur Protocol, which was agreed upon in 1985, was the first emission reduction agreement that was based on this goal. While Germany and some other West European nations responded to the alarms fairly quickly, progress in emission control in Eastern Europe during the 1980s was extremely slow, although many of these nations signed the convention. The East did not experience a significant reduction in emissions until after the fall of the communist regimes and about 1990— an industrial collapse. Science and policy related to air pollution have grown increasingly interested in the topic of climate change during the past ten years. Since the emission sources are frequently identical, managing them together has clear advantages (and tradeoffs, too) [4]. The potential to reduce short-term temperature increases by control efforts aimed at atmospheric pollutants that also warm the atmosphere, particularly black carbon and methane (for methane both by itself and as a tropospheric ozone precursor), have drawn a lot of attention. Short-Lived Climate Pollutants (SLCPs) are substances that affect both air pollution impacts and the balance of radiation in the atmosphere. Consequently, cooling chemicals are also included in SLCPs. Thus, minor secondary aerosols like sulphate particles, which are cooling the atmosphere, are also included in SLCPs. Recent studies have concentrated on ways to selectively manage these substances as well as ways to better understand how they contribute to air pollution and climate change. Another class of substances that has drawn more attention since the turn of the century is reactive nitrogen species. Around 2006, many actions were taken in Europe, including the creation of a Reactive Nitrogen Special Task Force under the Air Convention, a sizable EU nitrogen project, and the creation of a European Nitrogen Assessment. Here, nitrogen was taken into account as both a conventional atmospheric contaminant and in the context of society and industry [5].

References

1. Watts, N, et al. "The 2020 report of the Lancet Countdown on health and climate change: responding to converging crises." *The Lancet* 397.10269 (2021): 129-170.

2. Murray, et al. "IPCC special report on managing the risks of extreme events and disasters to advance climate change adaptation (SREX)." *J Epidemiol Community Health* 66.9 (2012): 759-760.

3. McMichael, et al. "Globalization, climate change, and human health." *New England Journal of Medicine* 368.14 (2013): 1335-1343.

4. Christopher, B., et al. Climate change 2014–Impacts, adaptation and vulnerability: Regional aspects. Cambridge University Press, 2014.

5. Woodward, et al. "Climate change and health: on the latest IPCC report." *The Lancet* 383.9924 (2014): 1185-1189.

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