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A man exercises in the morning as he faces chimneys emitting smoke behind buildings across the Songhua River in Jilin, Jilin Province, on February 24, 2013. (Reuters/Stringer)

INSIGHTS FROM A CFR WORKSHOP

Environmental Health and China's Rise

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In December 2016, the Council on Foreign Relations' Asia Studies program held a workshop on environmental health and China's rise to power. The workshop was made possible by the support of the Smith Richardson Foundation. The views described here are those of workshop participants only and are not CFR or Smith Richardson Foundation positions. ***The Council on Foreign Relations takes no institutional positions on policy issues and has no affiliation with the U.S. government.***

INTRODUCTION

The links between environment and health began to draw attention from policymakers at the turn of this century. Since then, the issue has increasingly become the subject of a series of publications by the Chinese government, international organizations, and think tanks.

These publications have advanced an understanding of the public health dimensions of environmental problems and Chinese society's response to environmental health threats. But analysis of this new policy field remains constrained by the lack of communication and collaboration between the environment and health sectors. Moreover, the existing literature tends to focus on illustrating a particular environmental health issue (e.g., air pollution, water pollution, food safety, etc.) rather than explicitly address the political side of the challenge.

Compared to other crises, environmental health challenges have some distinctive features that warrant special attention. It is extremely difficult to establish a causal relationship between particular environmental risks (e.g., soil contamination) and public health status, given the broad range of hazards to which individuals may be exposed. This not only makes targeted interventions difficult but also frustrates victims' efforts to redress their grievances. Also, environmental health issues are not explicitly addressed by a particular agency in China. Ambiguities over responsibilities are likely to lead to interdepartmental conflict.

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China's environmental health crisis is testing the resilience of the state. If the government fails to address the crisis effectively, as indicated by the exacerbating environmental health problems, the expanding gap between economic and social development—combined with growing social frustration over a worsening environment—could devolve into a bigger crisis that potentially can threaten the very survival of the political regime.

In December 2016, the Council on Foreign Relations hosted the workshop "Environmental Health Challenges to China's Rise," convening an international and interdisciplinary group of roughly thirty experts in New York. Participants discussed off the record environmental health linkages, the Chinese government's capability to respond to associated health crises, and international experience for coping with similar challenges.

ENVIRONMENT AND HEALTH LINKAGES

Epidemiological studies conducted since the 1980s reveal the devastating effects of pollution caused by rapid economic development on China's public health. Air pollution alone causes 1.2 million premature deaths annually from cardiovascular and respiratory complications, primarily in heavily populated areas of the country. Similarly, toxic substances that are widely used in agriculture and manufacturing have contaminated water supplies and farmland, leading to the emergence of "cancer villages," areas where rates of cancer are abnormally high due to pollution-related carcinogens. According to national surveys, roughly 19 percent of China's arable land is polluted, and 11 percent of digestive system cancers can be attributed to unsafe drinking water.

Researchers and journalists in recent years have identified additional connections between environment and health. Scientists from the University of Gothenburg in Sweden found that Beijing smog contained the highest concentration globally of antibiotic-resistance genes, including several that can be resistant to the most powerful antibiotics. Widespread pollution has profound effects on a person's physcial growth and health, starting in utero. Studies have shown that exposure to high concentrations of small particles from pollution in the womb contributes to significantly lower birth weight and height and to a higher probability of low bone mass and chronic medical conditions.

Workshop participants noted that the mechanisms and pathways of environmental health damage remain unclear. Certain pollutants have distinct physiological pathways in the human body. For example, ozone and small particles suspended in air called particulate matter (PM) affect the brain's chemistry. PM triggers an inflammatory response in the central nervous system, and carbon monoxide reduces the body's ability to release oxygen.

Broader Implications of Environmental Health Issues

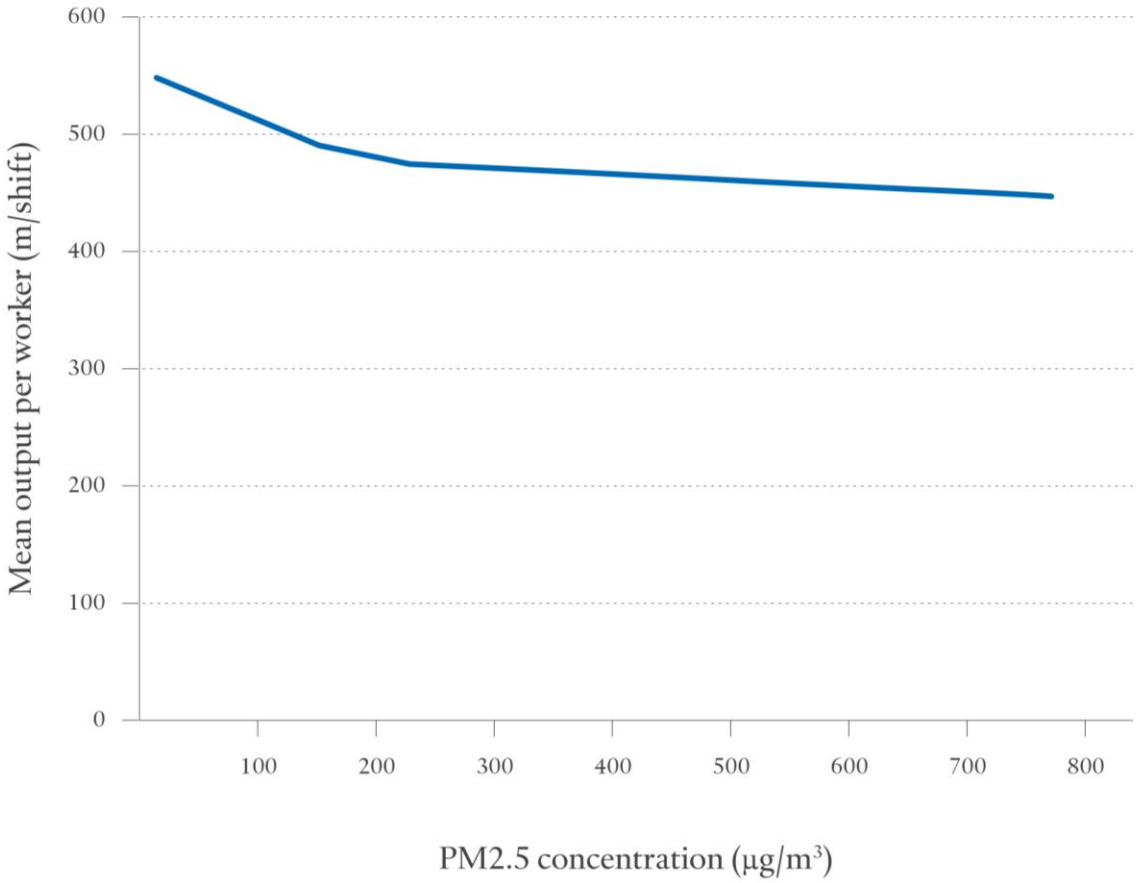
Workshop participants noted that environnmental health issues have broad social, economic, and political implications. Correlations have been observed between air quality and labor force productivity as well as volume of sales in e-commerce. Figure 1 shows large reductions in labor productivity (measured in worker's total output, in meters, over an eight-hour work shift), over the first 200 microgram per cubic meter ($\mu g/m^3$) rise in PM2.5 concentration. The World Bank has determined that environmental costs have totaled 9 percent of China's gross national income.

Air Pollution and Health Investments

- If 10 percent of heavy pollution days in China were eliminated, the total savings on facemasks would be approximately $187 million.
- People in China are willing to pay $4.40 for removal of every 1 microgram per cubic meter ($\mu g/m^3$) small particles (PM10) per person for five years.
- People in China are willing to pay $88 (or 3.8 percent of annual per capita income) for reduction in every 1 $\mu g/m^3$ fine particulate matter (PM2.5) per year per person.

Environmental health failures intensify social problems and rural-urban inequalities in China; for example, people with cancer face high healthcare costs that drag affected families into poverty. Participants noted that this may "break the bank" of the new national health insurance system that began in 2008 and covers 95 percent of the population, as cancer treatment is prohibitively expensive. Recent studies have shown that life satisfaction and cognition are negatively correlated with air pollution. In addition, some participants noted that increased environmental pollution is suspected to have caused a sperm quality crisis in China, as the national fertility rate is at a historical low.

Figure 1. Fine Particulate Matter (PM2.5) Concentration and Labor Productivity



Note: The solid line shows fitted spline; OLS and SLS regression analyses have not been shown.

Source: Jiaxiu He, Haoming Liu, and Alberto Salvo, "Severe Air Pollution and Labor Productivity: Evidence from Industrial Towns in China," IZA Discussion Paper 8916, Institute for the Study of Labor, Germany, October 2016, http://ftp.iza.org/dp8916.pdf.

CHINA'S POLICY PROCESS

Over the past ten years, the Chinese government has been criticized for its inability to undertake effective measures to address the environmental health crisis. Lack of transparency was a major concern, as roughly 50 percent of China's cities reported dubious PM2.5 data from 2001 to 2010. The Chinese government, recognizing the potential of environmental health problems to undermine its legitimacy, has become responsive to popular needs and made efforts to address the problems. In 2005, it established the Leading Group on Environment and Health, along with the National Action Plan on Environment and Health (2007–2015). Beginning in January 2011, China has made real-time, hourly air quality data for 113 major Chinese cities available online. Since September 2013, the government has released an action plan each on air pollution, water pollution, and soil pollution.

Recent Environmental Plans in China

- Air Pollution Prevention and Control Action Plan (September 2013)
- Water Pollution Prevention and Control Action Plan (April 2015)
- Soil Pollution Prevention and Control Action Plan (May 2016)

Still, there is limited mention of health in China's environmental regulation policies. Participants of the workshop observed that air pollution in China is framed primarily as an environmental, rather than a health, problem (compare the descriptions in figure 2).

Figure 2. Designations for Air Quality in China and the United States

	China Air Quality Index (AQI)	United States Air Quality Index (AQI)
	SO_2, NO_2, PM10, CO, O_3, PM2.5*	SO_2, NO_2, PM, CO, O_3, Pb*
0–50	Excellent	Good
51–100	Good	Moderate
101–150	Lightly polluted	Unhealthy for sensitive groups
151–200	Moderately polluted	Unhealthy
201–300	Heavily polluted	Very unhealthy
301–500	Severely polluted	Hazardous

* SO_2: sulfur dioxide, NO_2: nitrogen dioxide, PM10: particulate matter 10, CO: carbon monoxide, O_3: ozone, PM2.5: particulate matter 2.5, PM: particulate matter, Pb: lead.

Source: Junjie Zhang and Quan Mu, "Air Pollution and Defensive Expenditures: Evidence from Particulate-Filtering Facemasks," Social Science Research Network (November 1, 2014), accessed January 3, 2017, doi: 10.2139/ssrn.2518032.

Participants emphasized that, from an integrative environmental public health standpoint, the ultimate goal of setting air quality and emission standards is to protect public health with an adequate margin of safety. In that sense, the Chinese government faces three challenges to achieving this goal: its current focus on total emission control instead of improving environmental quality, the preoccupation with the costs of curbing pollution, and overly ambitious targets that, as one participant said, "lead to under-enforcement and massive noncompliance" on the part of manufacturers and local officials. Another participant noted that Chinese officials need to recognize clean air as a human right that should be granted equally to all citizens.

The Politics of China's Response to Environmental Health Challenges

Participants agreed that the Chinese political system has inherent advantages and drawbacks that define its response to the environmental health crisis. Although government officials previously argued that Western countries unfairly asked Beijing to shoulder the burden of environmental protection as a way to slow its industrial development, the Chinese government now sees environmental issues as a matter of sociopolitical stability and is employing new policy instruments to rein in pollution. Local government officials are now held responsible for environmental standards under their jurisdiction. Since 2015, China

has also centralized environmental governance by implementing vertical management of environmental monitoring and internal inspection functions below provincial levels. However, participants have observed that the government anticorruption campaign has caused a "wait and see" attitude among bureaucrats, effectively hindering innovative decision-making. In addition, the Chinese government continues to discourage its citizens from participating in open dialogue and redressing grievances through the courts. Centralized environmental governance may also lead to a one-size-fits-all aproach in addressing regional enviromental health hazards, making targeted, evidence-based intervention difficult.

Contrary to political attitudes in the United States and many other nations, China's "hierarchical governmental trust" is such that citizens have far greater faith in the central government's policy efforts to clean up the environment but are wary and untrusting of the local officials who are expected to implement these policies in their constituencies. When asked about governmental ability to handle environmental issues, 64.4 percent of Chinese respondents reported being satisfied with the central government, compared to 75.4 percent dissatisfied with the local government, according to a 2016 study by the pro-China Environmental Culture Council.

THE INTERNATIONAL COMPARATIVE PERSPECTIVE

Cleaning up the environment takes time, as shown by Los Angeles's efforts over fifty years to successfully curb air pollution. Participants agreed that two major lessons can be drawn from the U.S. experience in controlling air pollution. The first is that a country like China should heavily invest in technological innovation for environmental protection. Interestingly, many major technological breakthroughs in this regard have come about through strong regulation. Because of the market's inability to provide research and development as a public good and its failure to address polution as a negative externality, government regulation helps overcome this double market failure problem. China, unlike other countries that have tackled pollution, possesses science and technology capacities that will help it address pollution issues. Indeed, some Chinese cities are already beginning to innovate; for example, in response to strict regulations for cars, taxis are running on natural gas. However, participants noted, when implementing such regulations, China will have to avoid a one-size-fits-all approach.

The second lesson participants arrived at was that China should pursue an integrated approach in pollution control. Pollution cannot be solved just by putting a cap on emissions; cooperation from other policy sectors such as transportation and land use planning is essential. This can be achieved by providing financial incentives, faciliating the conversation among government agencies, and issuing judicial or administrative fiat. Real incentives for change come from the public. The U.S. experience suggests that cities where government officials report stronger pressures from their citizens to improve the environment tend to have better environmental performance. An understudied phenomenon is the influence of reputational incentives (e.g., embarrasment) in changing government officials' behavior in many countries around the world. This would especially be the case in China, where the concern over "saving face" under immense public pressure could incentivize government officials to commit to addressing environmental health challenges. Nevertheless, as one participant noted, the experiences of the United States and other countries in cleaning up the environment suggest that government involvement is essential to foster grassroots mobilization. Participants concluded that this relationship between the state and society has profound policy implications for China, which still seeks to suppress social movements demanding improvements in environmental health.