

# A conversation with Claire Walsh, February 1, 2019

## Participants

- Claire Walsh – Senior Policy Manager, Abdul Latif Jameel Poverty Action Lab (J-PAL)
- James Snowden – Research Consultant, GiveWell

**Note:** These notes were compiled by GiveWell and give an overview of the major points made by Ms. Walsh. All opinions are her own and do not necessarily express the views or opinions of J-PAL or J-PAL affiliates.

## Summary

GiveWell spoke with Ms. Walsh of J-PAL as part of its investigation into air pollution. Conversation topics included air pollution's sources and impact, possible air pollution interventions, and the air pollution reduction work being conducted by J-PAL and its affiliated researchers and other organizations. This conversation primarily focused on ambient air pollution rather than household air pollution.

## Sources and spread

Air pollution is emitted by a variety of sources. It can be either point source pollution, meaning it has a single, identifiable source such as a factory smokestack, or nonpoint source, meaning it has multiple different sources that are diffuse and mix together, like vehicle emissions. Particulate matter air pollution is particularly harmful to human health. The Air Quality Life Index (AQLI; <https://aqli.epic.uchicago.edu/>) reports that the top sources of particulate matter air pollution worldwide are fossil fuel combustion from vehicles (25% of global emissions), household wood and coal burning (20%), and power plants and industry (15%). The other top source is other human activities (22%), which includes biofuel and biomass burning for household use or clearing agricultural land.

The top pollution sources vary widely by location. The Real-time Air Pollution Index (<https://waqi.info/>) reports regular pollution readings for thousands of cities around the world. It does not have data on pollution sources by location. Urban Emissions (<http://www.urbanemissions.info/india-apna/>) recently published reports that list the top pollution sources for 20 cities in India.

How far air pollution travels depends on factors like wind, weather, and the altitude of emissions. Finer particles that are more harmful to health can sometimes travel hundreds of miles or more. The spread of particulate matter air pollution is more limited than that of carbon dioxide emissions, most of which can stay in the atmosphere for hundreds of years.

## Impact of air pollution on life expectancy

The AQLI, run by the Energy Policy Institute at the University of Chicago (EPIC), calculates air pollution's impact on life expectancy in places around the world using

estimates from studies that analyzed the effects of China's Huai River Policy, currently the strongest existing estimates of the impact of long-term exposure to pollution on life expectancy. The policy provided free or heavily subsidized coal for indoor heating during the winter to cities north of the Huai River but not to those to the south. For decades, this policy sharply divided the level of air pollution to which people in these two regions were exposed. Researchers have been able to measure the impact of this prolonged pollution exposure through regression discontinuity designs. The AQLI combines the impact of pollution on life expectancy with highly localized, satellite measurements of particulate matter around the world to provide insight into the life expectancy impacts of particulate pollution in locations all around the world.

## **Air pollution interventions**

### **Types of regulation**

Governments can regulate air pollution through either command and control or market-based methods. Command and control methods directly regulate the behavior of emitters in order to reduce emissions. Types of command and control regulations include:

- **Performance standards** — Performance standards limit pollution emission levels and impose penalties if those levels are exceeded. They do not specify how to achieve the required emission levels, enabling emitters to select the strategies that are lowest cost to them. They are thus more flexible than design standards.
- **Design standards** — Design standards require that specific technologies or practices be used to minimize pollution emissions (e.g., a requirement that factories install emissions-limiting technology on all new smokestacks). While more prescriptive than performance standards, design standards are useful in certain conditions, such as when monitoring of emissions is particularly difficult or when emissions-limiting technology can be adopted at a low cost or minimal burden to emitters. A successful example of such regulation in India was a requirement beginning in the 1990s that catalytic converters be installed in all new cars. In a recent paper, Drs. Michael Greenstone and Rema Hanna found that after the Supreme Court of India ordered that this regulation be enacted, pollution emissions reduced significantly.

In contrast, market-based methods use economic incentives to encourage emitters to develop their own strategies to reduce emissions. One example of a market-based method is a tax on pollution emissions or fossil fuels like coal. Another example is emissions trading, or cap and trade, programs, wherein governments set an emissions cap and establish a market in which emitters can buy and sell emissions allowances. Market-based methods have the potential to reduce pollution at the lowest cost to society because they allow firms to adjust their emissions according to their own costs of abatement. Like performance standards, they do not specify how polluters should reduce emissions. They can thus potentially encourage

innovation and the development of new, less costly ways of abating emissions. It is also possible to combine command and control and market-based methods in regulatory regimes that limit total emission levels but allow emissions trading to occur within those levels.

Different trading programs have achieved varying levels of success. In the United States, trading programs have successfully reduced emissions of sulfur dioxide and nitrous oxide. There are many functioning carbon dioxide trading programs in countries around the world, including in Europe and the US. However, one challenge in many of these markets is that the price of carbon has often been too low to induce large emissions reductions. This could potentially be addressed by tightening the cap and/or changing how and how many allowances are issued. Recently more countries, like China, have set up carbon markets as part of their efforts to meet their emissions reductions targets in the Paris climate agreement.

Different groups, such as economists, atmospheric scientists, regulators, and politicians, may prefer different methods of pollution regulation based on the priorities and approach of their disciplines. While command and control methods can effectively reduce emissions, many economists are interested in adding on market-based regulations because of the flexibility they give emitters to adopt the most efficient and least costly strategies for reducing emissions, and for their potential to encourage innovation in new technologies to abate emissions. There are many countries where environmental regulation does not have strong political traction writ large. In these contexts, market-based regulations, particularly carbon or coal taxes, tend to face some political opposition from firms and policymakers that oppose additional taxation. Despite this, both market-based and command and control regulation continue to expand around the world.

### **Context of interventions**

The contexts in which air pollution interventions are implemented vary in at least two major ways. First, pollution is emitted by a variety of sources and can be either point or nonpoint. Second, institutions and enforcement regimes vary significantly by country. For these reasons, effective interventions will vary by context.

However, Ms. Walsh believes that air pollution emissions can be reduced across many contexts by governments enacting and successfully enforcing certain widely used pollution regulations. There is evidence that such regulations, for instance the US Clean Air Act, have contributed to the success that previously highly polluted places in the US have had in reducing air pollution. Weak enforcement regimes can hinder the success of these regulations. Enforcement is often weaker in developing countries where regulators tend to have fewer resources for monitoring and enforcement.

#### *India*

The Constitution of India recognizes the right to live in a healthy environment. India's judiciary, particularly the Supreme Court of India, has historically played an important role in protecting that right. Supreme Court decisions, brought about by

public interest litigation, have led to new environmental regulations being enacted, and the court then requires that these regulations be enforced.

### **Examples of interventions**

There is no single intervention that, if implemented and scaled around the world, could singlehandedly eliminate pollution. Rather, there are many potential interventions that could contribute to reducing pollution. Certain interventions, if implemented successfully by governments and firms, could significantly reduce emissions. These include:

1. Improving enforcement of existing pollution regulations
2. Expanding command and control and/or market-based pollution regulation for industry and vehicles in high-polluting developing countries
3. Replacing universal fossil fuel subsidies that lead to over-consumption and pollution, and help the rich more than the poor, with targeted cash transfers for low-income households
4. Reducing reliance on coal through either a coal tax or retiring coal power plants and encouraging switching to renewables or natural gas

There are many other potential interventions that have not been tested and/or used as widely yet. Examples include requirements or incentives for farmers to end excessive crop and field burning or information disclosure programs that publicize the names of firms that exceed pollution standards.

Useful case studies of regulations in low- and middle-income countries include:

- A paper by Dr. Michael Greenstone and Dr. Rema Hanna measuring the impact of several past environmental regulations in India
- A paper by Drs. Esther Duflo, Michael Greenstone, Rohini Pande, and Nick Ryan measuring the impact of improved third-party auditing on industrial pollution in Gujarat, India
- A paper by Dr. Andrew Foster about environmental regulations in Delhi
- Case studies on China's recent "war on pollution"
- Case studies on the United States, Mexico, and China published on the AQLI website

### **Where to implement interventions**

It makes sense to focus on places with the worst air pollution, such as India and China, because their residents bear the highest disease burden. There are also several other countries with extremely high air pollution like Pakistan, Nepal, and Bangladesh. Similarly, in climate change mitigation, it makes sense to focus on places with the highest greenhouse gas emissions. Some places, such as India and China, have both high particulate matter air pollution and high greenhouse gas emissions. However, in the US and Europe, particulate matter air pollution is much lower, while carbon emissions are still high.

## J-PAL's air pollution reduction work

J-PAL's air pollution reduction work occurs primarily in India, where along with other partners, it works with government regulators to test interventions to improve the design and enforcement of pollution regulations.

For over a decade, J-PAL affiliated researchers Drs. Michael Greenstone, Rohini Pande, and Nicholas Ryan, along with Dr. Anant Sudarshan, have worked closely with India's Central and State Pollution Control Boards, J-PAL South Asia, EPIC at the University of Chicago, and Evidence for Policy Design (EPoD) at Harvard University to test new approaches to reduce pollution to inform policy and scale effective approaches. The interventions that have been or are currently being tested in partnership with Indian regulators include:

- **Improving industrial pollution auditing** — Researchers found that increasing the independence of pollution auditors reduced corruption and caused significant reductions in industrial pollution (Gujarat).
- **Improving pollution inspections** — Researchers found that randomly assigning pollution inspections was less effective in catching violations than allowing inspectors to choose which firms to inspect (Gujarat).
- **Five-star rating program**— Researchers are currently testing a five-star rating program that rates industrial firms according to how much they pollute and publicizes ratings (Maharashtra, Odisha).
- **Continuous emissions monitoring** — In order to improve enforcement, researchers are testing machines that can be installed in factories to report emissions to regulators continuously. Without these machines, regulators can only obtain such information during inspections, which can only be performed a few times per year due to limited resources. Increased availability of real-time emissions data would aid enforcement and could potentially encourage emitters to comply with regulations (Gujarat, Odisha).
- **Emissions trading scheme** — Researchers are testing an emissions trading program for particulate matter pollution, the first of its kind in India (Gujarat).

## Other air pollution reduction work

### NGOs

Worldwide, relatively few NGOs focus exclusively on air pollution reduction, which is instead usually one focus within a broader environmental organization. In India, there are several well-known NGOs working on air pollution reduction among other environmental issues. One is the Centre for Science and Environment (CSE), an influential organization that works on a range of issues, including pollution, farming, climate change, and environmental justice. CSE conducts research, which it uses in broad-based advocacy of Indian policymakers. The Energy and Resources Institute (TERI) is another think tank and research organization working to improve energy and environmental policy in India, including reducing pollution. The Regulatory

Assistance Project works with regulators in India, China, Europe, and the US to encourage quicker transitions to clean energy in the power sector, and partially focuses on air quality and pollution.

### **Funding**

Ms. Walsh believes that there is significantly less funding available for pollution reduction than for climate change. Some of the active funders in pollution reduction and climate change include Bloomberg Philanthropies, the Children's Investment Fund Foundation, the ClimateWorks Foundation, the MacArthur Foundation, and the William and Flora Hewlett Foundation.

*All GiveWell conversations are available at  
<http://www.givewell.org/research/conversations>*