Illustration by Andrea Ucini

The Environmental Cost of Inequality

Power imbalances facilitate environmental degradation—and the poor suffer the consequences

By James K. Boyce

IN THE FALL OF 2016 AN ENVIRONMENTAL STRUGGLE IN RURAL NORTH DAKOTA made headlines worldwide. The local Standing Rock Sioux Tribe and climate activists were pitted against the corporate and government backers of the Dakota Access Pipeline, which was being built to carry oil from the state's Bakken shale fields to a terminal in Illinois. Private security guards unleashed attack dogs on protesters, and the police blasted them with water cannons in freezing weather.

The tribe feared that a leak in the pipeline as it crossed under a reservoir along the Missouri River would contaminate its water supply. Climate activists joined the protest to fight ramped-up extraction of fossil fuels. Supporters of the $3.8-billion project argued that it would save the oil industry money, being less costly than the alternative of oil shipment by rail, and that its construction would bring jobs with multiplier effects to the local economy. Because the price of oil is set on world markets, the cost saving would not mean lower prices for consumers—but it would bring higher profits to producers.

By December 2016 the U.S. Army Corps of Engineers announced that it would deny approval for the pipeline crossing, a decision greeted with whoops of joy at the protesters' encampment. But four days after taking office in January, President Donald Trump overturned the ruling, and a few months later the oil began to flow.

The battle reflected what seems to be a basic reality: When people who could benefit from using or abusing the environment are economically and politically more powerful than those who could be harmed,

the imbalance facilitates environmental degradation. And the wider the inequality, the more the damage. Furthermore, those with less power end up bearing a disproportionate share of the environmental injury.

We see these situations all around us. Polluting power plants and hazardous waste dumps are located in poor neighborhoods. Drinking-water impurities afflict minority communities. But is this relation between power and environmental degradation consistently true? If so, why? And what can we do about it? At Standing Rock, the balance between the opposing sides was close; Trump's election was enough to tip the scales. But the experience, along with some recent shifts in power balances, offers lessons—and even hope—that efforts to reduce economic and social inequality will be good not only for people but also for the environment.

GREATER INEQUALITY, GREATER HARM

RESEARCH on the connection between social power and environmental degradation began in earnest in the 1990s. Economists reported that they had found an inverted U-shaped relation between pollution and per capita income. They plotted air and water pollution on the *y*-axis of a graph and average income on the *x*-axis, comparing dozens of countries. Pollution initially increased as income went from $0 to a turning point of up to about $8,000 a year. But after that, pollution decreased as income rose further. This became known as the environmental Kuznets curve because of its similarity to the relation between inequality and average income found in a famous 1955 study by economist Simon Kuznets.

The environmental Kuznets curve appeared to offer respite from the bleak assumption that rising production and consumption necessarily lead to more environmental damage. Maybe humans were not, as environmental historian Roderick Nash once put it, a "cancerous" species whose growth "endangers the larger whole." A spirited debate ensued among analysts who saw economic growth as the solution to environmental woes and those who still saw it as the crux of the problem.

I was not convinced by either side. Maybe that was because in my 20s, I had lived among some of the world's poorest people in a Bangladesh village. That experience left me with the indelible understanding that human societies cannot be neatly summed up by population or per capita data. Many Bangladeshis went hungry but not because the country had too many people or too little food per person. There was enough food for everyone, yet communities starved because the poor lacked the purchasing power to buy it in the market and the political power to obtain it by other means. In his 1981 book *Poverty and Famines,* economist Amartya Sen explains that famines typically arise from similar realities. Inequality in the distribution of wealth and power seems to be central to how societies function and malfunction.

In thinking about the original and environmental Kuznets curves, it occurred to me that inequality, not per capita income, might underlie environmental degradation: the two seemed to rise and fall together. When then Ph.D. student Mariano Torras and I reanalyzed the environmental Kuznets curve data in 1998, we found that countries with lower rates of adult literacy, fewer political rights and civil liberties, and higher income inequality—which we considered to be indicators of more unequal distributions of power—tended to have more polluted air and water. After controlling for these indicators, the apparent effect of per capita income weakened, and for some pollutants, it disappeared entirely. We also found that greater inequality was associated with less access to clean drinking water and sanitation facilities, both crucial to the environment and human well-being.

In a 1999 follow-up study, my co-authors and I examined the 50 U.S. states. We analyzed the relation between the strength of state environmental policies and the distribution of power, using as proxies the rate of voter participation, the percentage of adults completing high school, tax fairness and Medicaid access. We found that wider inequality was associated with weaker environmental policies and that weaker policies were associated with more environmental stress and poorer public health. These results suggested that the pathways by which inequality adversely affects health include not only physiological stress, violence and reduced access to health care—all of which had been documented by public health researchers—but also impacts on the environment.

The initial reactions to our findings were decidedly cool. In the 1990s, when free markets and deregulation were all the rage, concerns about inequality were brushed aside as passé, maybe even soft-headed. One reviewer claimed that I was "beating a dead horse."

In the 2000s, however, inequality reemerged as a central political issue. The growing gap between the "1 percent" and everyone else, the terrible toll of Hurricane Katrina on low-income residents in New Orleans and the economic dislocations that followed the 2008 financial crisis all helped to put it back on the agenda. At the same time, evidence mounted that more concentrated wealth and political power leads to worse environmental performance—and not just in terms of air and water pollution. Researchers found that the proportion of plants and animals threatened with extirpation or extinction is higher in countries with more unequal income distributions. Rates of deforestation are higher in countries with greater corruption. Public expenditure on environmental research and development and patents on environmental innovations are lower in industrial nations with greater income inequality. More inequality has also been linked to higher carbon emissions per person and per unit of gross domestic product.

These findings make sense when we consider that with less inequality, people are better able to defend the air, water and natural resources on which their health and well-being depend. Protecting the environment and reducing inequality go hand in hand.

POWER RULES

ANY ACTIVITY THAT CAUSES environmental degradation generates winners as well as losers. The activity benefits some people—otherwise no one would pursue it. And some people bear the costs—otherwise the degradation would not be seen as a problem. This poses a basic question: Why can those who benefit from such activities impose environmental costs on others?

There are three possible answers, all of them related to power disparities. One is that the costs are deferred, borne by future generations, who are not here today to defend themselves. In such cases, as when we think of the long-term impacts of climate change, the only way to safeguard the environment is for those of us who are alive to take responsibility toward those "whose faces are yet beneath the surface of the ground, the unborn of the future Nation," in the words of the Iroquois Constitution.

A second possibility is that people who are harmed are unaware of being hurt or do not know where the harm comes from. They may realize, for example, that their children are getting sick but not that the illness can be traced to emissions from a nearby refinery or power plant. In such cases, the solution lies in greater access to knowledge and, in particular, in policies that guarantee the public's right to know about environmental hazards and their sources.

The final possibility is that even when people are well aware that they are bearing the brunt of environmental costs and know the sources, they lack sufficient economic and political power to prevail in social decisions about the use and abuse of the environment. Standing Rock is an example. The solution in such cases is to change the balances of power.

Government decisions affecting the environment often invoke a cost-benefit analysis: How much benefit can be gained and at what cost? In this calculation, economic power (also known as purchasing power) plays a key role. People with more dollars effectively wield more "votes."

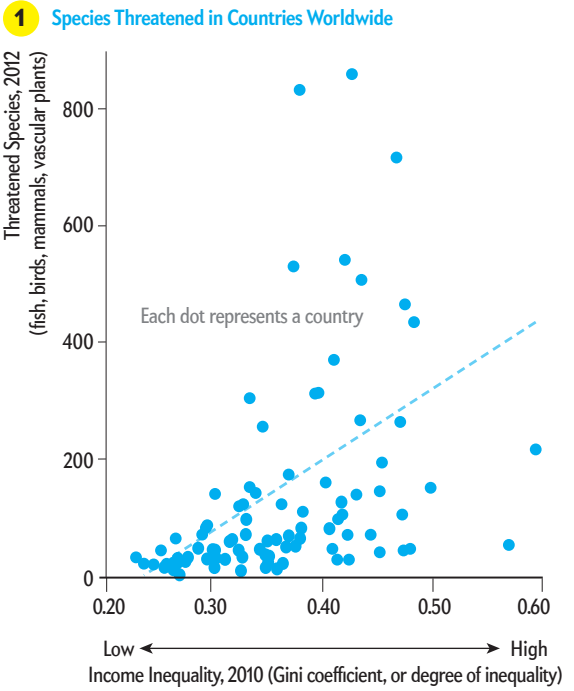
When the people who could be harmed have little or no political power, decision makers can minimize or ignore the costs. An extreme example is the cost-benefit case the U.S. Environmental Protection Agency made under the Trump administration for repealing the Clean Power Plan. It assigned a value of zero to all climate impacts outside the U.S., reasoning that harms to people not in the country should not be considered in the making of U.S. climate policy.

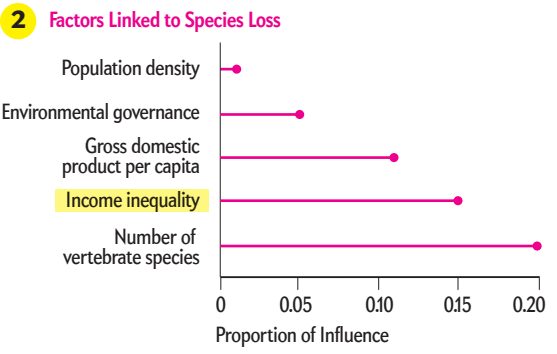
Purchasing power and political power tend to be correlated: those with more dollars often have more political influence, and vice versa. Their joint effect can be described by a concept I call the power-weighted social decision rule. It means that the weight assigned to the costs and benefits from environmentally degrading activities depends on the power of the people to whom those accrue. When those who benefit from environmentally degrading activities are wealthy and powerful, compared with those who are harmed, social decisions favor the winners over the losers. The greater the inequality between rich and poor and between the more powerful and the less powerful, the greater the extent of environmental degradation.

Power inequality also exacerbates the neglect of future generations and lack of knowledge about environmental costs. When inequalities are wide, the imperatives of day-to-day survival for the very poor may overshadow worries about tomorrow; among the very

MORE INEQUALITY, FEWER SPECIES

Many studies show that as the gap between rich and poor people widens, the extent of environmental damage increases. For example, one analysis found that countries with higher income inequality also have higher rates of species classified as threatened by the International Union for Conservation of Nature (1). A separate report determined that income inequality is more strongly correlated with species loss than other major factors such as population density and even environmental policies (2). Only the total number of species had greater influence.





Sources: "Inequality and Environmental Sustainability," by S. Nazrul Islam. United Nations Department of Economic and Social Affairs Working Paper No. 145. United Nations, August 2015 (*number of species threatened*); "A Cross-National Analysis of How Economic Inequality Predicts Biodiversity Loss," by Tim G. Holland, Garry D. Peterson and Andrew Gonzalez, in *Conservation Biology*, Vol. 23, No. 5, October 2009 (*factors linked to species loss*)

Graphics by Jen Christiansen

OBJECTION to the Dakota Access Pipeline in North Dakota by local Native Americans concerned about contaminated water supplies grew to a larger protest nationwide against corporations and politicians having more power than underserved communities.

rich, fear that their sway will eventually end can foster a cut-and-run attitude toward natural resources (exemplified by the rapacious deforestation of Southeast Asia in the 1960s and 1970s under such dictators as the Philippines' Ferdinand Marcos and Indonesia's Suharto). And when inequalities are wide, the poor are more likely to lack access to information, including about the nature and causes of the environmental harms to which they are subjected.

HEADS I WIN, TAILS YOU LOSE

THE POWER-WEIGHTED social decision rule predicts not only that greater inequality will lead to greater environmental harm but also that the harm will be concentrated in communities at the lower end of the wealth-and-power spectrum. In those places, environmental costs carry less weight in the eyes of decision makers. Racial and ethnic minorities and low-income communities are at greatest risk. The Standing Rock reservation, where 40 percent of residents fall below the federal poverty line (triple the national rate), was vulnerable on both counts.

At the same time, the benefits from environmentally degrading activities—higher profits for producers and lower prices for consumers—are concentrated at the upper end of the economic spectrum. Profits flow to shareholders and corporate executives, who generally are relatively well off. And the more that consumers spend, the more they benefit from lower prices, again bestowing greater benefits on the well-to-do.

This is not to say that affluent people do not want a clean and safe environment. But to a substantial extent, environmental quality is what economists call an impure public good. It is not equally available to everyone. Well-off people can afford to live in cleaner places, buy bottled water and air conditioners, and get better medical care. They can also more effectively oppose having environmental hazards placed in their neighborhoods. By being further removed from environmental harms, they can more easily afford to ignore them. Even when they cannot altogether escape the consequences of environmental degradation, they weigh a relatively small share of the costs against a relatively large share of the benefits.

ENVIRONMENTAL INJUSTICE

SINCE THE 1980S researchers have systematically documented the disproportionate exposure of racial and ethnic minorities and low-income communities to environmental hazards in the U.S. One of the earliest studies, by sociologist Robert Bullard, examined the spatial distribution of hazardous-waste sites in Houston and found them to be located primarily in Black neighborhoods.

Subsequent studies have revealed similar patterns in many parts of the country: race and ethnicity correlate strongly with proximity and exposure to environmental harms. In multivariate analyses, race and ethnicity turn out to be even stronger predictors of pollution exposure than low income, testifying to the enduring salience of racism in the distribution of power in the U.S. The most hard-hit communities are often those where disadvantages of race and class intersect.

Researchers have also investigated how the correlations can be explained. One controversy that arose was about timing: Are hazardous facilities sited from the outset in communities with less wealth and power? Or, after a facility is sited, do wealthier residents move out, property values decline and poorer people move in? Few studies have explored this question directly, but those that do have found strong evidence that such toxic facilities are sited from the start in communities with less power. The evidence also indicates that in cases where more well-to-do people leave after a facility is built, the trend had already begun

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before the siting, suggesting that communities in transition are more vulnerable to having environmental hazards imposed on them.

Disproportionate pollution exposure hurts children in particular, resulting in higher rates of infant mortality, lower birth weights, a higher incidence of neurodevelopmental disabilities, more frequent and intense asthma attacks, and lower school test scores. Among adults, exposure is linked to work days lost to illnesses and the need to care for sick children. Over time these health effects reinforce the disparities that make communities more vulnerable to environmental harm in the first place.

Although the effects are most severe for at-risk communities, they often spill over to wider populations. For example, U.S. metropolitan areas with more residential segregation along racial and ethnic lines tend to have higher cancer risks from air pollution for everyone, not only for people of color. In cities that rank in the top 5 percent nationally for racial and ethnic disparities in industrial air pollution exposure, the average exposure for non-Hispanic whites is significantly higher than in those where pollution disparities are smaller. Environmental justice is good for everyone.

Environmental inequalities can be found everywhere. In England and the Netherlands, poorer and more nonwhite neighborhoods have higher air concentrations of particulate matter and nitrogen oxides, which aggravate respiratory problems. In Delhi, whose residents breathe some of the world's dirtiest air, the poor live in some of the most polluted neighborhoods. They also spend more time working outdoors, including along roadways, where air pollution loads are most extreme. They cannot afford air conditioning or air purifiers. At the same time, they obtain fewer benefits from the power generation, transportation and other industries that cause the pollution.

The power-weighted social decision rule operates at the international scale, too. Environmental harm is unduly inflicted on the poorest countries. In a 1991 memorandum, Lawrence Summers, then chief economist at the World Bank, wrote that "the economic logic behind dumping a load of toxic waste in the lowest-wage country is impeccable" because the foregone earnings from illnesses and deaths there will be lowest. His statement may have been tongue-in-cheek, but environmental practice often follows this script. Every year millions of tons of toxic waste are shipped from advanced industrial countries to low-income nations in Africa, Asia and Latin America.

The Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal, an international environmental agreement that took effect in 1992, has proved inadequate to halt this flow. The distance between people who benefit from the economic activities that generate the waste and those who bear the costs of its disposal gives a painful new twist to the adage "out of sight, out of mind."

THE NEW ENVIRONMENTALISM

SO WHAT CAN WE DO to lessen social and environmental inequality, thereby reducing harm to people and the planet?

The relation between inequality and the environment is a two-way street. Reducing inequality in the distribution of wealth and power helps to bring about a greener environment. And efforts to advance the right to a clean and safe environment help to bring about greater equality. The key to both is active mobilization for change.

U.S. environmentalism in the 20th century aimed to protect nature from people. Enlightened elites often saw themselves as defenders of nature from the irresponsible masses. From there it was a short step to assume an inexorable trade-off between environmental protection and broad-based economic well-being.

WHEN PEOPLE WHO COULD BENEFIT FROM USING OR ABUSING THE ENVIRONMENT ARE ECONOMICALLY AND POLITICALLY MORE POWERFUL THAN THOSE WHO COULD BE HARMED, THE IMBALANCE FACILITATES ENVIRONMENTAL DEGRADATION.

In the 21st century we are witnessing the ascendance of a new environmentalism. The aim is to protect individuals who face harm from people who profit from degradation. The balance of power between these two sides can and does change over time. When climate activists from across the country joined Native Americans at Standing Rock, defending their right to a clean and safe environment, the power-balance scales began to move. The protesters, building on past achievements of movements across the country for equal rights and environmental protection, again came close to halting a multibillion-dollar enterprise in 2020, when a federal judge ordered the Army Corp of Engineers to undertake a new environmental review of the pipeline.

Similarly, in Washington State, activists succeeded in blocking a proposed coal export terminal that would have been the largest in the country, protecting lands and waters of tribal communities. In Montana, the Blackfeet Nation won the cancellation of energy leases on 23,000 acres, the culmination of a 30-year struggle.

The intimate links between inequality and the environment have led to growing recognition that if we want to rebalance human relationships with nature, we also need to rebalance our relationships with one another. SA

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