

# **Inequality and the Environment**

## **Leontief Prize Lecture**

Tufts University  
Medford, Massachusetts  
March 28, 2017

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It is a pleasure to be here today and an honor to receive this award. I'm especially pleased to be doing so along with Joan Martinez Alier, who in addition to being an inspiring economist is also an old friend. In fact, his daughter was my daughter's first babysitter more than 30 years ago in Oxford.

In announcing the Leontief prize, GDAE referred to my work on inequality and the environment. So I thought it would be appropriate to share with you how I came to work in this area, and to highlight some things I've learned.

### **Inequality as a cause of environmental degradation**

I began my career in the field of development, specifically agriculture (this is another thing Joan and I share in common). In the middle of my undergraduate studies I worked for two years in the Indian state of Bihar on a Gandhian land reform project. A few years later, my partner Betsy Hartmann and I lived in a Bangladesh village with the aim of writing a book to address some basic questions that Westerners have about people in what used to be called the Third World – questions like: what are the causes of poverty and hunger? what is the position of women? what's the role of religion? what's the impact of foreign aid? In our book, *A Quiet Violence*, we explored these issues through the stories of real people, as much as possible in their own words.<sup>1</sup>

These were formative experiences. Living among some of the world's poorest people, and coming to see life through their eyes, profoundly shaped my views of the world and its problems. One important lesson was about the debilitating effects of the unequal distribution of wealth and power. The fact that hundreds of millions of people went hungry, then and still today, is not because there's not enough food in the world, but because they lack the purchasing power to buy it in the market and the political power to obtain it by other means. The peasant farmers and agricultural laborers of Bangladesh and Bihar understood these realities clearly,

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<sup>1</sup> Hartmann and Boyce (1983).

even though they came as news to many economists a few years later when Amartya Sen laid them out in his book, *Poverty and Famines*.<sup>2</sup>

In South Asia I also began to understand that inequality not only determines who eats and who starves, with results that can be tragic and obscene, but also constrains productivity, resulting a smaller economic pie than what would be possible in a more egalitarian and productive society – an effect that can be termed the "inefficiency of inequality."

When I entered graduate school at Oxford a decade after having set foot in Bihar, this was what I wanted to explore. At Oxford I was very fortunate to study with two brilliant economists, Keith Griffin and Amartya Sen. With their guidance I returned to South Asia to carry out research for my dissertation, which analyzed how agrarian inequality impeded the development of irrigation and water control to the detriment of rice production. This became my book *Agrarian Impasse in Bengal*.<sup>3</sup>

I mention this background because our relationship to the environment – as a source of raw materials and as a sink for disposal of wastes – is similar in important ways to the relationship of South Asian villagers to the land. In both cases, the distribution of wealth and power determines who gets what, and shapes how we use – or abuse – nature's wealth.

After completing my doctorate I accepted a job in the University of Massachusetts Amherst economics department – then, as now, an oasis for free thought in a profession that too often seems to believe in a free market in everything but ideas. The intellectual blinders on economists were particularly tight at the time, in the era of Ronald Reagan and Margaret Thatcher. At UMass I started a course called "The Political Economy of the Environment" in which my students and I explored interactions between inequality and the environment.

In the early 1990s I received a Fulbright fellowship to go to Costa Rica to help establish a master's program in ecological economics and sustainable development at the National University. While I was there, I was invited to speak at a conference – it was my first public presentation in Spanish – on political economy and the environment.

The English version of that talk appeared in the journal *Ecological Economics* in 1994. It was titled "Inequality as a Cause of Environmental Degradation." This was an effort to theorize how the inequalities of power and wealth that structure our relationships with other people also structure our relationships with nature. I began by noting that wherever we encounter environmental degradation, we can pose three questions:

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<sup>2</sup> Sen (1981).

<sup>3</sup> Boyce (1987). See also Boyce (1988).

- First, who benefits from the activities that cause the problem? If nobody wins – or at least, thinks they'll win – the activities would not occur.
- Second, who bears the cost? If no one were harmed by these activities, they wouldn't be a problem – at least from the standpoint of human welfare.
- Third, why is it that the winners are able to impose these costs on the losers?

I suggested three possible answers to this last question:

One is that the losers do not yet exist: they belong to future generations who are not here to defend themselves. In such cases, I believe the only solution is for the present generation to cultivate an ethic of responsibility towards those who will follow, an ethic that in my mind goes together with gratitude for what we've received from those who came before us.

The second possibility is that those who bear environmental costs lack information. They may know that their children are getting sick, for example, but not that the cause is pollution from a nearby factory. In such cases, the solution lies in environmental education – including crucially the right to know what's in our environment and who put it there.

The third possibility is that those who are harmed are alive today, and are well aware of what's happening, but that they lack sufficient wealth and power to prevail against those who benefit from environmentally degrading activities. I call this the "power-weighted social decision rule": a society's decisions about whether, when, and where to degrade (or protect) the environment are shaped by the preferences and relative power of those who win and lose from that decision.

The power to influence environmental outcomes operates in both the market and in the state. In the sphere of the market we call it "purchasing power." In the sphere of the state we call it "political power." These two domains of power are correlated: people with more wealth tend to have more political influence, and vice versa.

The state-market dichotomy dominated political and economic discourse in the 19<sup>th</sup> and 20<sup>th</sup> centuries, demarcating "left" from "right." But in analyzing the political economy of environmental degradation we can discern a more fundamental dichotomy: between societies with democratic versus oligarchic distributions of wealth and power.

I hypothesized in my 1994 article that wider inequalities of wealth and power generally result in more environmental degradation. At the time, this was a decidedly unpopular view. A referee for a volume to which I was invited to contribute a follow-up paper panned the idea, asserting that "Boyce is beating a

dead horse," a phrase that for some reason stuck in my mind. He meant that in the end-of-history days of the roaring nineties no one still thought that inequality was something to get worked up about.

It turns out the horse was only on tranquilizers. Now it's wide awake and kicking, and inequality today is all the rage – in more senses than one.

I and other researchers went on to test the power-weighted social decision rule hypothesis against the empirical evidence. Analyzing international variations in pollution and other environmental indicators, Mariano Torras and I found that equality – especially when measured by the extent of literacy and political rights and civil liberties – is a strong predictor of environmental degradation.<sup>4</sup> Similarly, when several colleagues and I analyzed inter-state variations in the U.S, we found that states with more equally distributed power – as proxied by voter participation, educational attainment and fiscal policy fairness – tend to have stronger environmental policies and better environmental outcomes.<sup>5</sup>

Returning to South Asia for a moment, the Indian scholar Bina Agarwal has documented the environmental impacts of equality and inequality along the axis of gender. In India's forest-dependent communities, those where women participate in management committees use forest resources more sustainably than those where women are excluded.<sup>6</sup> Gender equity is not only good for women – it turns out to be good for the environment, too.

More research remains to be done to understand how inequality affects the environment. But it is no longer outlandish to maintain that it does.

### **Environmental degradation as a cause of inequality**

Let me now turn to causal linkages in the reverse direction, running from environmental degradation to inequality.

A second hypothesis suggested by the power-weighted social decision rule is that environmental costs are not distributed randomly across the population. They are not impartial "externalities." Instead these costs are imposed disproportionately on communities with less wealth and power.

This prediction is consistent with the findings of the now-extensive literature on environmental justice (EJ). Beginning in the 1980s, Robert Bullard and other

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<sup>4</sup> Torras and Boyce (1998). Reprinted in Boyce (2002). See also Baek and Gweisah (2013), Cushing, Morello-Frosch, Wander and Pastor (2014) and Holland, Peterson and Gonzalez (2010).

<sup>5</sup> Boyce, Klemer, Templet and Willis (1999). Reprinted in Boyce (2002).

<sup>6</sup> Agarwal (2010).

researchers began to document systematic disparities in exposure to environmental hazards in the United States, focusing initially on the disproportionate siting of toxic waste dumps in African-American neighborhoods.<sup>7</sup> These findings, coupled with pressure from EJ activists, led to President Clinton's 1994 executive order directing federal agencies to identify and address disproportionately high and adverse human health and environmental impacts on minorities and low-income populations.

Since then, EJ researchers have produced an extensive body of evidence documenting that environmental disparities mirror inequalities in the distribution of wealth and power. A notable finding in this literature is that race and ethnicity are highly significant predictors of environmental harm, even after controlling for the effect of income. This finding casts doubt on the proposition that market dynamics, arising from lower housing prices in more polluted neighborhoods, suffice to explain our environmental disparities. It attests instead to the enduring connection between race and power in America – political as well as purchasing power.

Indeed there is evidence that environmental inequalities in the United States are greater than income inequalities. Exposure to toxic air pollution from industrial sites, for example, is more unequally distributed than income, both vertically (from lowest to highest) and horizontally (between groups defined by race and ethnicity).<sup>8</sup>

In response to these findings, some might ask, "So what?" By many measures – including life expectancy, income, employment, education, and incarceration rates – there are vast inequalities, both vertical and horizontal, in the U.S. In this landscape of multiple and overlapping disparities, how important is the environmental layer?

Put differently, is environmental quality a luxury – something that affluent and perhaps middle-class people can afford to worry about, but an issue that ranks low on the list of priorities for disadvantaged communities?

Apart from its value as an intrinsic human right, a clean and safe environment has important instrumental value, too, particularly for children. For example, when Manuel Pastor and his colleagues analyzed school performance in Los Angeles, controlling for usual determinants such as parental income and education, class size and teacher salaries, they discovered that exposure to air toxics has a significant negative effect on standardized test scores.<sup>9</sup> Pollution exposure has been shown to

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<sup>7</sup> Bullard (1983). See also Pastor (2003), Ash and Fetter (2004), Bullard (2008), Bullard, Mohai, Saha and Wright (2008), Zwickl, Ash and Boyce (2014), and Mohai and Saha (2015).

<sup>8</sup> Boyce, Zwickl and Ash (2016).

<sup>9</sup> Pastor, Sadd and Morello-Frosch (2002). See also Currie, Hanushek, Kahn, Neidell and Rivkin (2009), Lucier, Rosofsky, London, Scharber and Shandra (2011), and Mohai, Kweon, Lee and Ard (2011).

have serious adverse impacts on fetal and child health.<sup>10</sup> It also results in lower property values, more days lost from work due to illness and caring for sick kids, and higher health care expenditures.<sup>11</sup>

Low-income and minority communities across the country have given their own answer to the "so what" question by mobilizing to fight against the contamination of their air and water. Indeed polls in the U.S. find that people of color often are more environmentally aware than whites. An ABC News/Washington Post poll released in November 2015, for example, found that 78% of non-whites agreed with the statement that climate change is a serious problem, compared to 56% of whites.<sup>12</sup>

A final point I want to make about environmental justice is it's not a zero-sum game. At first blush one might imagine that higher pollution burdens for people of color mean a cleaner environment for Anglo whites. But the total quantity of pollution varies as well as its distribution. It turns out that localities where industrial air pollution is more unequally distributed tend to have higher exposure for everyone, including whites.<sup>13</sup> Perhaps corporations act as if the cost of pollution is lower when it's borne primarily by minorities, so they emit more of it. Perhaps whites put more political capital into influencing zoning and housing policies in regions with higher pollution. Or perhaps – a dispiriting thought – whites care more about their pollution burden relative to minorities than about its absolute level. Whatever the reasons, this finding implies that environmental justice could be good for white folks, too.

### **Policies to combat inequality and environmental degradation**

I was given the opportunity to work more on the policy implications of the links between inequality and the environment starting in the late 1990s, when my colleagues Bob Pollin and Jerry Epstein established the Political Economy Research Institute (PERI) at UMass Amherst. PERI provided a platform for me to launch a number of collaborative research projects.

One of these was the Natural Assets Project. This was the brainchild of Michael Conroy, who at the time was working as a program officer at the Ford Foundation.

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<sup>10</sup> See, for example, Chay and Greenstone (2003), Currie and Neidell (2005), and Currie, Neidell and Schneider (2009).

<sup>11</sup> See, for example, Currie, Davis, Greenstone, and Walker (2015) on property values; Fann, Fulcher and Baker (2013) on work-day losses; and U.S. Environmental Protection Agency (2014) on health care costs.

<sup>12</sup> "Two in Three Call Climate Change Serious; Many Still See Scientific Disagreement." ABC News/Washington Post poll, November 30, 2015. Available at <http://www.langerresearch.com/wp-content/uploads/1173a5ClimateChange.pdf>.

<sup>13</sup> Ash, Boyce, Chang and Scharber (2012).

The project's aim was to explore how environmental protection can be reframed as building assets in the hands of low-income communities and individuals. It gave me the opportunity to bring together a remarkable group of scholars and activists from around the country and around the world, from whom I learned a great deal. I will conclude today by offering two examples of the natural asset-building strategies that we proposed.<sup>14</sup>

### *Cultivated biodiversity*

The first is a strategy for conservation of the biodiversity that underpins long-term food security for humankind. I'm referring here to genetic diversity in crops and livestock, the cultivated biodiversity that evolved through what Charles Darwin, in the opening chapter of *On the Origin of Species*, called "artificial selection."<sup>15</sup>

Artificial selection is the evolutionary process, guided through millennia by human hands, by which plants and animals were first domesticated and then diversified into thousands of distinct varieties adapted to environmental and cultural differences across the globe. This diversity provides the foundation for the ability of agriculture – "modern" as well as "traditional" – to adapt to changing pest and pathogen populations and also, in coming years, to climate change.

A hallmark of industrial agriculture has been the displacement of these diverse varieties by a handful that have been bred to maximize specific properties, above all the ability to turn fertilizer into grain. The resulting monocultures may be "efficient" from the perspective of short-run profit maximization, but they achieve this at the long-run peril of putting all our eggs in one basket. To adapt to changing growing conditions over time, agriculture depends on the suite of diverse varieties that is being eroded by modern agriculture itself.

This genetic erosion ranks alongside climate change as perhaps the greatest environmental challenge of our time. Regrettably, it does not receive commensurate public attention, perhaps in part because many environmentalists, especially in the United States, are wedded to a vision of "wild" nature that disdains human-altered landscapes and cultivated biodiversity.

The loss of crop and livestock diversity remains far from complete, however. Across the world, and especially in the historic centers of origin of crops that as the great Russian biologist Nikolai Vavilov recognized are the modern centers of diversity, farmers carry on the long tradition of conservation and ongoing evolution of cultivated diversity. These farmers include campesinos growing maize and beans in the hills of south-central Mexico and Guatemala and potatoes in the Andes; peasants

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<sup>14</sup> For more, see Boyce and Shelley (2003) and Boyce, Narain and Stanton (2007).

<sup>15</sup> For more on crop genetic diversity and its conservation by small farmers, see Brush (2004), Mann (2004) and Boyce (2006, reprinted in Boyce 2013).

cultivating rice in south and southeast Asia; and small farmers tilling wheat and barley in the Near East and central Asia and millets in Africa.

Apart from cultivating diversity, what do these farmers have in common? First, they are poor, often desperately so. Second, far from being appreciated for their vital contribution to current and future food security for humankind, they are looked down upon. They are scorned as backward by elites in their own countries and most international development experts, too. Third, their livelihoods are today threatened by cheap imports from industrial agriculture that often are dumped below the market cost of production, let alone their environmental cost. Finally, as a result, more and more of them – particularly young people – are abandoning the land to seek better a life elsewhere. As they do so, the erosion of cultivated diversity accelerates.

It would be a mistake to think we can fully insure against this loss of biodiversity by simply by storing seeds in "gene banks." *Ex situ*, off-site collections, like the one at the National Laboratory for Genetic Resources Preservation in Fort Collins, Colorado, are tremendously valuable, and it is vital that we fund them and keep them under public control. But they are not an adequate substitute for *in situ*, in-the-field diversity for three reasons:

- First, gene banks can never be 100% secure. Accidents happen. So do wars and natural disasters. Biological material is not inert, like gold and silver. Seeds must be stored under the right temperature and humidity, and periodically replanted, harvested, and stored again – otherwise they die.
- Second, simply having seeds in the bank does not mean we know what we have. The records may show that a packet of seeds was collected in a given time and place, but we don't know whether this variety is resistant to new strains of insects or diseases or climate variations. The farmers who grow them are the repositories of this knowledge, and without them the seeds lose much of their value.
- Finally, even if seed banks were perfectly secure (which they aren't) and we knew all there is to know about every variety (which we can't), the most they can do is to freeze in place the existing stock of genetic diversity. Seed banks do not replicate the ongoing evolution of diversity in the field under the pressure of evolving pests and pathogens and climate changes. The interaction between humans and nature that originally created and now sustains this diversity cannot be stored in a vault.

The good news is that we can maintain diversity in the field by rewarding the farmers around the world who cultivate it. This will require a radical shift in agricultural policies. Instead of subsidizing industrial monocultures, we need to reallocate public resources and recognition to small farmers, above all in the centers

of diversity. We need to abandon our myopic definition of "efficiency" and replace it with a more robust standard that embraces resilience and sustainability. Rather than undermining the livelihoods of the women and men who cultivate diversity, we need to reward them. Rather than disparaging them, we should thank them. By rewarding their contributions to our common good, we can advance jointly the goals of reducing inequality and protecting the environment.

### *Carbon dividends*

Let me turn lastly to the other great environmental challenge of our time, global climate change.

In one sense, just about anything we do to mitigate climate change will mitigate inequality, too, since it is the poorest people at home and abroad who are most vulnerable to the impacts of climate destabilization. This grim reality was illustrated vividly in New Orleans in 2005, when those who lost their homes and lives to Hurricane Katrina were disproportionately poor and disproportionately black.<sup>16</sup>

Burning fossil fuels releases a toxic stew of pollutants – including sulfur dioxide, nitrogen oxides and fine particulates – along with carbon dioxide, the main greenhouse gas. For this reason, curbing their use will generate air quality and public health "co-benefits." Because they bear the highest pollution burdens, low-income and disadvantaged communities stand to gain the most, especially if climate policies are designed with these benefits in mind.<sup>17</sup>

The clean energy transition will require very large investments in energy efficiency and renewables. As my PERI colleagues Bob Pollin and Heidi Garrett-Peltier have shown, these require considerably more labor per investment dollar than does fossil fuel extraction. Retrofitting buildings for energy efficiency, for example, creates many jobs in the building and construction trades. In economies with substantial unemployment and underemployment, these employment gains also make a major contribution to the reduction of inequality.<sup>18</sup>

These ways that climate policy can reduce inequality are widely recognized. Here I want to focus on a less familiar opportunity: carbon dividends. This is an idea I first learned about from Peter Barnes, a colleague in the Natural Assets Project.

One key element of effective climate policy is putting a price on carbon emissions. This can be done by means of either a carbon tax or a cap-and-permit system. From an administrative standpoint, it is simplest to charge the price where fossil carbon

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<sup>16</sup> Pastor, Bullard, Boyce, Fothergill, Morello-Frosch and Wright (2006).

<sup>17</sup> Boyce and Pastor (2013) and Boyce (2017).

<sup>18</sup> Pollin, Garrett-Peltier, Heintz and Hendricks (2014) and Pollin (2015).

enters the economy, at the tanker port or coalmine head or natural gas terminal. The tax or permit cost enters into the price of the fuel and is passed on to final users, including you and me. This provides an incentive for households, businesses and governments to consume less carbon and invest in energy efficiency and renewables.<sup>19</sup>

A drawback of carbon pricing – of any policy that increases fuel prices – is that it is distributionally regressive. Richer households typically have bigger carbon footprints than low-income and middle-class households, for the simple reason that they consume more of just about everything. In absolute dollar amounts they would pay more as a result of a carbon price. As a percentage of income, however, poor households would pay more than the rich, reflecting the fact that fuels are a necessity, not a luxury. On its own, therefore, carbon pricing would exacerbate economic inequality rather than reducing it.<sup>20</sup>

But the extra money that consumers pay as a result of carbon pricing does not evaporate. It is not shot to the moon or buried in the backyard. It is not sent to Saudi Arabia and other oil producers. Instead this money is available for recycling within the economy of the nation or state charges the carbon price.

One way to recycle part or all of the money is through dividends that are paid equally to every woman, man and child. This has been proposed in the US by Senators Maria Cantwell and Susan Collins, and by Congressman (now Senator) Chris Van Hollen. Their bills would set a cap on carbon emissions that tightens over time, issue permits up to this limit, auction all the permits, and return all or most of the revenue to the people as dividends.<sup>21</sup>

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<sup>19</sup> This is not to say that carbon pricing ought to entirely supplant other elements in the climate policy toolkit, such as regulation and public investment. A smart policy mix would use more than one instrument. For example, smart regulations can complement a carbon price by promoting research and development of new technologies or by ensuring emission reductions from sources with the greatest air quality co-benefits. Public investments, ranging from local projects to retrofit school buildings to national projects to rebuild rail transport infrastructure, are clearly important parts of the mix, too. One can accept that carbon pricing is necessary without claiming that it is sufficient.

<sup>20</sup> While this is true in industrialized economies, the picture may be different in low-income countries. Data from China in 1995, for example, indicate that carbon pricing at the time would have been progressive: upper-income households spent more on fossil fuels not only absolutely but also as a percentage of their expenditure (Brenner, Riddle and Boyce 2007).

<sup>21</sup> See Boyce and Riddle (2011) and Boyce (2014). Similar policies have been proposed at the state level. In Massachusetts, for example, several carbon tax-and-dividend bills are pending in the state legislature.

Carbon dividends are an example of a broader class of policies that would provide universal basic income from assets that we own in common. For example, the state of Alaska pays equal dividends annually to all residents from its oil revenues.<sup>22</sup>

Since carbon dividends would be paid equally to all, regardless of how much fossil fuel they personally use, everyone would still have a strong incentive to reduce their consumption of fossil fuels. Recycling carbon revenues as dividends turns the regressive impact of carbon pricing into a progressive impact. Most low-income households would come out ahead in pocketbook terms, since the dividends would exceed their increased fuel costs. Middle-class households generally would break even, with the dividends protecting their real incomes. Most rich households would pay more than they get back in dividends, but they can afford it – and they and their children would share in the benefits of climate stabilization and clean air.

Much as rewarding small farmers for sustaining crop genetic diversity would combat inequality and protect our environment at the same time, so would price-and-dividend carbon policies. As these examples illustrate, fighting inequality and environmental degradation are not only complementary in theory: they can be pursued together in practice.

This is where I believe environmentalism is headed in the 21<sup>st</sup> century. We will not safeguard the environment without addressing the inequalities of wealth and power that perpetuate pollution and natural resource depletion. And we will not achieve a more equitable society without protecting the environment. If my work helps others to make and act upon these connections, I will feel I've done something to earn this prize.

Thank you.

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<sup>22</sup> See Barnes (2014).

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