

# China and Environmental Degradation

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China's national day, October 1, is an appropriate day on which to review where China stands. I work for chinadialogue.net [[www.chinadialogue.net](http://www.chinadialogue.net)], a bilingual, Chinese/English website which tries to create a rational and reasonable conversation between China and the non-Chinese world about climate change and the environment. For the past eight years, we have been looking at China's growing environmental crisis, China's contribution to global climate change, its position now as the world's largest carbon emitter, and what China is choosing to do—or not do—about it.

When we began in 2006, there hardly was a climate conversation in China, and the environmental conversation took second place to the push for economic development. But in the past six or seven years, China and climate change has become a subject discussed not only in China, but around the world. Now chinadialogue.net has offices in Beijing and London and in Delhi, where we look at trans-boundary water problems in the Himalayan watershed, a topic that involves China as well as South Asia.

General Charles de Gaulle, the leader of the Free French Forces in World War II and later president of France, once delivered himself of an observation on China that remains one of my favorite clichés: China is a big country, he said, inhabited by many Chinese. Whether he knew it or not, he identified one thing that makes China so important to all of us: its sheer size. If China were fifteen countries the size of Morocco, we wouldn't be talking about it. But because China is one unitary state, whatever it does has enormous impact. China has not always been this big. China was approximately half its current size until the end of the Ming Dynasty in 1644. But the Manchu, the next imperial power, were a central Asian tribal power, so they brought in a lot of other central Asian territories that included Mongolia, Xinjiang, and Tibet. When the last emperor abdicated in 1912, a very painful transition from an empire to a modern state began, a transition that continues. China is an old civilization, though certainly not the oldest, and, paradoxically, in its present political form it is a very young country and still in the painful process of nation building. China is still trying to decide some basic questions, such as who the country belongs to and who owns the state. These are fundamental questions which remain unanswered.

In 1949, after forty years of internal and external war, the Communist Party took power. There

followed another thirty years of internal violence under Chairman Mao. After Mao's death and Deng Xiaoping's return to power in the late 1970s, China abandoned Mao's millenarian socialism and took the course of economic liberalization. It opened up to foreign investment and became the world's factory, which produced an explosion of investment-led, low added-value manufacture that had a dramatic effect on the economy, on the social structure, and on the political structure. Most of what it produced went to advanced economies to be consumed, but the whole process changed China very quickly. It brought very rapid urbanization, with a huge shift of the rural population to the cities, until China finally, a couple of years ago, became predominantly urban.

It also had negative effects, amongst which we should count Beijing's notoriously noxious air, which has very high levels of ambient toxins and small particulate matter. Our Beijing editor Liu Jianqiang and other commentators complain that China's Ministry of Environmental Protection is a disappointment, but it is not entirely the ministry's fault. It is a small and weak ministry that is trying to cope with the consequences of the world's biggest industrial revolution. Although it is ineffectual, we should give it a little bit of indulgence.

We should also remember that China is not the first or the only country to have destroyed its environment in pursuit of wealth. Leeds, a formerly industrial city in the north of England, looked just as bad between 1860 and the 1950s. Every country that has had a carbon-heavy industrial revolution has also suffered severe pollution. As late as 1969, the Cuyahoga River in Ohio caught fire, so badly was it polluted. That was one of the episodes that helped to raise environmental consciousness in the United States. We might look at China and think, "What a mess," but some people in China believe the "mess" is evidence that they are developing.

China does not behave particularly badly, environmentally, nor does China consume more than anybody else. In fact, there's no doubt about who has consumed the most: the most developed countries, particularly those in Europe (including my own country, the United Kingdom) and the United States. Even with China's rapid economic growth, its contribution, as a proportion of the global ecological footprint increase, is still relatively small compared to developed countries.

With a growing middle class in China, it's worth wondering what could happen if everybody consumed at the U.S. rate. The short answer is that we would need five planets. China is just about on target in its current global footprint, but as China's affluence grows, that will change. And because, as General de Gaulle observed, China is a very big place and a lot of people live there, when that changes, it's going to have serious global effects.

One of the things that cause people to worry about China is the fact that it is a one party state. When China embarked on its reforms, its leaders were clear that they did not want to follow the example

of the USSR and embark on political reforms before economic reforms. The Chinese opted for economic reform today and political reform one day. We are still waiting for the second day to arrive.

It has worked reasonably well to date in some respects, but one of the consequences is that, in order to retain legitimacy, the Party has to deliver ever-rising living standards. This is one of the drivers of the focus on GDP growth at the expense of almost everything else.

There is also the tension that comes from success. When the other economic tigers in Asia got to middle income level, they went through a political and social transition. Taiwan was a Kuomintang dictatorship until it reached about \$11,000 per capita GDP, at which point a strong political movement produced the only democracy in the Chinese-speaking world. South Korea also made the transition. So did Japan, which had formally been a democracy, but not a very convincing one.

With affluence comes pressure from the middle class for more participation in political decision making, in planning, and in other things. We have nearly reached that point in China. From the outside it can seem like a big, successful, rather scary country. China's the new kid on the block, and we don't quite know what to do with it. But the closer you are to the leadership, the more worried and insecure they look.

Right now, all politics in China happen within the Party, some of them very dramatic, like the events that surrounded Bo Xilai in the run-up to the recent leadership change. But what do China's leaders worry about day to day? If you're running China, you wake up in the morning worrying mostly about domestic affairs: maintaining power, economic growth, and, increasingly, the state of the environment and what it's doing to politics. You worry about poverty and the very wide gap between rich and poor, about water pollution and the fact that you're not treating the waste properly, about water scarcity and air pollution—in fact, about all the negative consequences of the last thirty years of growth. Just at the point when the economy needs to move into a more sophisticated phase, a phase of more advanced technologies and more sustainability, China is faced with the very large bills that come from the last thirty years of pollution.

For the last thirty years, people have quoted GDP growth as a measure of progress in China and have talked about three or four decades of double-digit growth. But if we look at the uncounted costs of this model of development, as the government began to do about five years ago in an exercise in green GDP, it looks very different. They tried, as an experiment, to look at the economy in the round, factoring in the externalities. It was not reassuring: in some provinces, they calculated a growth rate of about 11% but an environmental cost of about 12%. When you look at it that way, China's trajectory looks very different. The clean-up costs in health, food production, and soil, air, and water pollution are all big bills that China is going to have to face.

The leadership also worries about meeting the needs of one-fifth of the world's population on a relatively small share of the world's assets, and about how to develop a country constrained by these enormous pressures. China has grown in many ways. It has shiny new cities, a lot of infrastructure, and airports. But down at ground level, the basics have often been neglected. Cities have not kept up in the treatment of their own waste. As a water-scarce country, China ought to be preserving its surface water, but because of the lack of regulation, waste is just dumped into rivers, so water is both scarce and polluted. The same is true of scarce agricultural land. Twenty percent of it has been lost to cities, and about a third of it is vulnerable to erosion and desertification.

Of all these, water is the key concern. The Chinese state came into being around the management of water. The mythical Yellow Emperor's main job was to control the rivers, because China's rivers were always troubling. One reason that the Chinese state is so strong is that it always had to undertake engineering works, and the Chinese have been thinking about managing water ever since. Water remains a difficult issue, particularly in North China, and the impacts of the last three decades have made it worse. In fact the total cost of China's air and water pollution will be a drag on the economy for the foreseeable future. Back in 2005, there were some who were already warning that the model had to change, but at the time, the majority view in China was, "Let's develop first. We'll clean up later, just as everybody else did." But if you start from a very constrained base there is very little room to make the mistakes that others made.

One man who did warn about the environmental disaster to come was a Vice Minister of Environment, Pan Yue. He was one of the more progressive thinkers and produced many of the ideas that are now mainstream. Phrases that you will see in the speeches of Chinese leaders, such as "building ecological civilization," began with Pan Yue. At the time, he was a voice in the wilderness, and it took time for these ideas to be accepted. But by the twelfth Five-Year Plan, which is now four years old, China was committing itself to a more sustainable economic model. We can see the steady greening of formal policy, of targets, and of strategy in the progression of ideas through the eleventh to the twelfth Five-Year Plans. If this were to work, China would soon become a much more sustainable economy and society.

Why did this happen? Typically, in this type of tigerish development, countries begin with a rapid growth, highly polluting stage and then try to move up the value chain once they have priced themselves out of cheap manufacture. They start off with the low wage advantage, as China did in a very big way. Manufacturing moved there because it was cheaper; people accepted low wages because moving into the cash economy was a big step up from being a peasant. In time that cost advantage runs out, as it has in China. Wages and costs are rising, and the one child policy, which China has pursued for the last thirty years, has resulted in the world's most rapidly aging population. So the Chinese population is shaped like

an inverted pyramid, with a lot of middle-aged and old people and relatively few young people, which means that the readily available pool of mobile, diligent manual labor is drying up.

As in other countries, the costs of this stage of development eventually became too high, and the rewards too low. In order to progress to middle-income status, China has to turn to more advanced technologies, rather than just being the world's assembly plant. With no existing advantage in established technologies, China has to look at the technologies of the future: low-carbon technologies, renewable energy, battery technology, and so on—the technologies required when the world makes its transition to a sustainable energy base. The twelfth Five-Year Plan, therefore, has a multi-part strategy that involves investment in new technologies and targets for energy efficiency, though not yet targets for carbon emissions. It aims to rebalance the Chinese economy away from export-led growth and towards a domestic consumption model.

China has gone very rapidly from one of the most equal societies in the world to one of the most unequal. There is a huge concentration of wealth at the top and in the Communist Party, while households and ordinary workers have been losing ground in their share of national income. There are a lot of billionaires, but there are many more people who worry about educating their children, about old age and poor health. They're not ready to become the big consumers that China's new model requires. The other distortion in the Chinese economy is that, so far, growth and prosperity have largely been concentrated in the east. The west, which is poorer, has remained relatively undeveloped, an imbalance the government is now trying to correct.

The government is also trying to clean up, but it is hitting some problems. When Beijing held the Olympics in 2008, there was a big effort to clean up Beijing's air because elite athletes were concerned about performing there and China's national pride hung on the success of the Olympics. So why, in January 2013, did we have the worst air pollution disaster in China so far?

Well, there are a lot of reasons. In 2008 the eyes of the world were on China. In order to clean up Beijing's air the government shut down factories in Héběi Province and moved factories out of Beijing. They banned certain kinds of vehicles from entering the city and stopped construction for six months before the Olympics. This enormous effort worked in the short term. But once the Olympics were over, the vehicles returned, the Héběi factories cranked up again, and the model did not change. By January of this year things were far worse again.

The pollution in January 2013 and January 2014 was catastrophic. The smallest and most dangerous type of particle pollution is called PM-2.5. It causes long-term lung damage. The World Health Organization standards set safe daily levels at 25 micrograms, but in Beijing on January 13, 2013, levels reached 700 micrograms. Most of the equipment used to measure these particles doesn't go beyond 500 micrograms.

These levels would not have been made public in Beijing had it not been for the U.S. Embassy, which had grown a little suspicious over the years about the “blue sky days” and “air quality: good” that the authorities were reporting. The U.S. Embassy put a monitoring device on its roof and began to tweet the readings. People latched onto this very quickly and noticed the discrepancy between the monitoring from the U.S. Embassy roof and the reports of the Beijing government. One of the biggest gaps was that Beijing simply did not report PM-2.5 levels.

The Chinese government tried to stop the U.S. Embassy Twitter feed on the dubious grounds that it contravened the Vienna Convention, the convention that regulates diplomatic behavior. But by then people in Beijing had bought hand-held digital monitors, so they were able to monitor the air themselves. The authorities were eventually forced, first, to admit how bad it was, and then to come up with a plan to fix it.

Long-term improvement is very difficult to achieve because it involves changing the energy mix of coal-dependent North China. China has also built a whole set of car-dependent cities. Although the cars have reasonable fuel efficiency standards, the quality of the fuel that Chinese refineries produce is very low, so a fuel-efficient vehicle can still be highly polluting, especially when traffic is jammed up and cars sit there, pumping out noxious fumes.

Given the ambitions of the twelfth Five-Year Plan, it is discouraging to notice that everything is still getting worse. One of the reasons for this is that China has a top-down political system with very few horizontal controls. Any official wants to please the boss and be promoted, and he or she knows that telling the truth doesn't always please the boss. A more effective tactic can be to guess what the boss wants to hear and make sure that that's what he does hear. If the boss says, “We have to have a 20% improvement in energy efficiency,” that is what he will be told. Since there are not enough ways of double-checking, the Chinese state can find itself working with erratic and unreliable data. A more open information regime, with a free press and a vigorous civil society, would help to get round this. Instead, China is trying to solve a broad problem with a very narrow instrument of top-down coercion.

China depends on coal for most of its energy because it does not have much of anything else. Even with the twelfth Five-Year Plan's efforts to reduce the proportion of coal, overall coal use continues to grow because the energy demand continues to grow. Coal-fired generation in North China plays a big role in Beijing's air problem and it's not going to get better anytime soon. In fact, even if the responsible thing is to drive an electric car—and China is investing a lot in electric mobility—charging an electric car anywhere in North China has a heavier carbon footprint than fueling a conventional car. That is the cost of coal generation.

It also has a terrible effect on global carbon emissions. China has overtaken the United States and now emits about half again as much carbon as the U.S. does. It's also true that China's use of energy

remains very inefficient. China uses far more natural resources and energy to produce one dollar of GDP than even countries like India, where we might expect a kind of equivalence. China also has the highest number of deaths per ton of coal in the world. Apart from the visible air pollution, the high levels of heavy metals and mercury and their effect on the development of children are serious problems.

Another difficulty in changing the energy mix is water. China suffers from both water scarcity and uneven distribution. South of the Yangtze there is often rather too much water, but in North China, where 40% of China's GDP is produced, water is extremely scarce and always has been. This is semi-desert, and not a promising place to build a capital or to grow wheat. Further west, there is even less water. Since all energy decisions have a water implication, and all water decisions have an energy dimension, this constrains China's options. China starts with an available water per capita level lower than sub-Saharan Africa. Three decades of rapid growth have severely polluted surface water. The governance system doesn't work, and officials are highly motivated to conceal pollution incidents from the boss.

Add to that an agricultural sector that is now forced to use polluted water for irrigation. Pollution is transferred to the soil and is taken up into the food chain, so we now see recurring scandals in the food supply. Cadmium in rice was one of the most recent ones, but it is commonplace to discover pollution in food. Cleaning up soil pollution is extraordinarily difficult and expensive, so the longer this goes on, the more serious it becomes, and the more difficult to attend to. There is an intractable conflict between China's energy needs, its available energy, and its water problem, which always comes back to coal.

There is no easy way to break the circle. China's coal use is going to grow and China is using about 20% of its water, now, in the coal industry. If coal use expands, the competition between coal, energy, and other sectors for these diminishing supplies of clean water will become more acute. Coal also distorts China's transport system because it is mined in the north and the west, and it takes a huge amount of railway capacity to move it to the east, where it is needed.

To try to break this dependence on coal, the Five-Year Plan aims to increase non-fossil fuel energy sources, including hydropower, nuclear power, and renewable energy, and to cap coal use. There are certain renewable energies that do not have a big water footprint, but others do. Obviously hydropower does. The kind of dam building frenzy that has gone on in China for the past twenty to twenty-five years is set to continue, this time on trans-boundary rivers: the headwaters of the Mekong, the headwaters of the Brahmaputra, and almost all the trans-boundary rivers in the Himalaya. This is also the most active seismic earthquake zone in the world, and there is concern about the safety of the big dams being built there. Fracking has a big water footprint, as does nuclear energy, so it's hard to escape from the water needs of the energy sector. Given the trajectory of China's water use, China is heading for a major water crisis very soon.

The government is making enormous efforts to break many of these vicious cycles, but it isn't easy. China has announced a kind of Great Leap Forward in nuclear energy, but if nuclear energy can go so wrong in Japan, what are the risks of a rapid expansion in China?

Is this environmental crisis also another kind of crisis? Is it a social crisis? A political crisis? How profound a crisis might this be for China? In 2007 there was a demonstration in a city called Xiamen, a southern city in Fujian Province. It was the first time that the Chinese middle classes took to the streets after the Tiananmen Square massacre in 1989. What was it about?

Xiamen is one of these nice, relatively clean, pleasant, middle-class cities that has seen big benefits from the economic growth of the last ten years. People have bought houses and are living the good life, so when they heard that a large chemical plant was to be built in their neighborhood, they protested. It was a plant to produce paraxylene, a product that is uncontroversial elsewhere and is key to synthetic textiles. But the idea of a large and, to them, noxious chemical plant in their neighborhood so vexed the people of Xiamen that they took to the streets in a major demonstration.

The authorities first reacted by shutting down the internet and digital communications and by telling people to go home. But the people went on marching until they won: Beijing ordered another environmental impact assessment that concluded that the chemical plant should go somewhere else. Since Xiamen, there have been similar demonstrations all over China, in which the middle class have asserted their right to determine how they live, to defend their property and their neighborhoods. This is problematic for the Party. Although the Party wants a twenty-first century society, a society of innovation and modest prosperity, it also fears the political consequences.

We tend to think of democracy as being about the ballot box. It's hard to imagine, if you called an election tomorrow in China, who the candidates would be, other than the existing authorities. But in a participatory society, there are many ways in which political demands can be expressed, demands including the desire to control the immediate environment and the right to go to the law and have the law work.

These demands are a threat to absolute authority, so we seem to be at a crunch point in China's development. The existing system cannot deal with the problems that China faces, but changing the system has big political implications. The government is struggling with inadequate instruments to address a series of complicated problems. It is afraid of reaching for instruments that might help, such as a vigorous civil society, the rule of law, and an uncensored press. There are around 80,000 major demonstrations in China each year, and many of them are about the environment. It's a big country, but even so, this is a high level of discontent. So far, President Xi Jinping has not lived up to the expectations of a more liberal moment in China. In fact, China has been moving in the opposite direction. We have to wish him luck, since it's not in anybody's interest for China to descend into chaos or to fail to deal with

what are also our problems. As General DeGaulle said, China is a big country, inhabited by many Chinese, and none of us can escape its effects.