

# **THE FILTHY TRUTH: CHINA'S GROWING ECOLOGICAL CRISIS AND THE DANGER THAT IT POSES FOR THE REST OF THE WORLD**

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China is today experiencing a period of intense economic growth the like of which the world has never seen. Since 1980 the Chinese economy has surged, growing an average rate of 10 percent a year and some coastal areas have grown at nearly 20 percent a year. During that period China's GDP in real terms has increased nearly nine times and hundreds of millions of people have been lifted out of absolute poverty. The growing prosperity has improved the quality of life in multi-faceted ways – reducing infant mortality, improving child and maternal health, and lengthening life expectancy. What has happened here is one of the most dramatic stories of human and national transformation in human history. But there is a severe downside to this story -- an evolving environmental crisis that threatens to derail much if not all of this progress.

The eras of communism in China, as in the Soviet Union, and Market Leninism have not been kind to the environment. China is simply too big for its britches—only half the land is cultivable meaning that twenty percent of humanity must fight for survival on less than seven percent of the world's landmass. To make matters worse, the Maoists showed no respect for the environment and the current regime, while completely aware of the problem, is in no position to fix it. Its very survival depends on maintaining economic growth even at the expense of the environment.

A combination of neglect, overpopulation, careless industrialization, and desire always to emphasize growth over the protection of nature have placed China on the path to environmental catastrophe. You see the signs everywhere. The deserts in the north are marching towards the towns and villages on the fringe, gradually annihilating them as it spreads ever closer to Beijing and other great cities. Waterways that just a few years ago gushed torrents of water today spawn only a trickle or are completely dried up. A clear example of this phenomenon is the dry riverbed under Marco Polo Bridge where World War II began in earnest in China. Food is often contaminated with illegal and often alarming levels of animal hormones and agricultural chemicals. New diseases such as SARS and avian flu pop up more and more. Air pollution even in the capital is so bad that in winter one often has trouble looking across a main thoroughfare. Animal and bird species face extinction as wet lands and forests disappear. Many of China's legendary rivers which still appear as blue lines on a map are now almost bone dry. Several towns and cities are quite literally sinking into the ground due to the removal of groundwater or the careless building of mining shafts and tunnels.<sup>1</sup>

The problem is that China's impressive growth has come at the cost of equally spectacular environmental degradation. Over the past three decades the most commonly measured forms of environmental pollution –particulate matter concentrations, sulfur dioxide

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<sup>1</sup> James Kyngé, *China Shakes the World: A Titan's Rise and Troubled Future—and the Challenge for America* (New York: Houghton Mifflin, 2006), p. 131.

levels, greenhouse gas emissions – have all increased in various parts of China to life threatening levels. But the problem is not just air pollution. It is also water pollution, dead rivers, acid rain and rapidly growing desertification. Even the Chinese state media is saying that the situation is becoming very serious and is causing economic losses.<sup>2</sup> Any visitor to China can attest to the very tangible ways in which “environmental pollution reduces quality of life - the dank atmospheric haze, the way the air hurts the lungs and eyes, the way white shirts turn brown after a day outside.”<sup>3</sup> The pollution problem grows worse year by year. By 2000 China was releasing 13 percent of global carbon dioxide (CO<sub>2</sub>) emissions, second only to the United States at 23 percent, and that figure has grown in the last few years.

Overwhelming reliance on coal, particularly in the industrial and energy sectors, is the main reason China is now the second largest producer of energy behind only the United States. Moreover, over 70 percent of China's energy demand is met by coal. No other major world economy is so dependent on coal; the world average is only 27 percent. The burning of coal (which in China is generally of low quality) is responsible for 70 percent of particulate and 90 percent of sulfur dioxide emissions. Shifting to cleaner fuels will bring about a significant reduction in air pollution in China. The industrial and energy sectors utilize some 80 percent of China's annual coal consumption, and produce much of China's air pollution. But coal used for cooking and heating in the residential sector and auto pollution account for increasingly significant amounts of pollution.<sup>4</sup>

China's current crisis, however, does not result just from activities over the past three or four decades. According to one report:<sup>5</sup>

While the past two decades of reform have dramatically increased both the pace and the scope of China's environmental challenge, China's environmental crisis is really born of centuries of environmental degradation and pollution. And you can find records of environmental protests that date back to the early 1800s from polluted water. You can find records that date back 100 or 200 years before that of areas where resources such as fish were once plentiful and no longer then were because of over fishing, population pressures. And certainly centuries of war took their toll as armies denuded forests for fuel, or mined for ores for armor and for spears and this kind of thing. So, again, the period in the past 25 years or so of reform has taken their toll on the environment, but China was not beginning with a pristine environment.

The following case studies illustrate some of the staggering problems facing China today.

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<sup>2</sup> John Taylor, ABC NEWS report on China's environmental crisis, 5 December 2004. <<http://www.abc.net.au/correspondents/content/2004/s1258000.htm>>.

<sup>3</sup> Alex Wang, “The Downside of Growth: Law, Policy and China's Environmental Crisis” in *Perspectives* (2:2). <[http://www.oycf.org/Perspectives/8\\_103100/downside\\_of\\_growth.htm](http://www.oycf.org/Perspectives/8_103100/downside_of_growth.htm)>.

<sup>4</sup> Alex Wang, *op. cit.*

<sup>5</sup> John Taylor, *op. cit.*

## The Yellow River: A symbol of China's Difficult Struggle to Modernize

The Yellow River [Huanghe] is both a symbol of China's greatness and of its many problems. It starts deep in the mountains of western China and winds its way for 5,464 kilometers to the sea. Fed by glaciers and underground deposits of water in the high reaches of Qinghai Province on the Tibetan Plateau, it nourishes 120 million people through the heart of China. As the most heavily silt-laden river in the world, the Yellow River got its name from the muddiness of its water, which bears a perennial ochre-yellow color.

While traveling through Qinghai Province, our 2006 China Fulbright group first encountered the river as a relatively small mountain stream, no wider than my living room and easily fordable by a clumsy old oaf as myself, but as it descends down the mountains onto the Tibetan plateau, it turns into a mighty rushing river passing through some of the most beautiful mountains and countryside in the world. Later it descends into China's heartland where for thousands of years it has supplied water for the nation's rice paddies and for the thirsty millions who live near its banks. It also passes by growing cities with ever-growing numbers of factories as China transforms itself from a rural agricultural nation into an urban industrial monster. The river provides the factories and cities with the water they need to survive.

But just as the river is one of China's greatest benefactors, it also symbolizes China's the country's greatest problems and sorrows. The trouble, in fact, starts right at the head of the river in the Qinghai highlands. Chinese researchers have recently made a disturbing discovery—that the very glaciers that feed the river have shrunk 17 percent since the mid-1970s and that the glaciers are melting at an accelerating rate of seven percent a year due to global warming. Furthermore, the underground aquifers that also supply water are drying up at an alarming rate. Underground water levels were sinking and chains of smaller feeder lakes were receding or drying up altogether. Air temperatures are slowly rising, up two degrees since the 1980s, while the old pattern of two rainy seasons per year is often down to one.

The Yellow River, however, faces its greatest crisis further downstream when it passes through growing modern cities like Wuhai. A *New York Times* reporter noted:

Decades of strip mining had already transformed some parts of coal country into vast tracts of denuded wasteland. Rapid industrialization made Wuhai a pollution nightmare. The Yellow River itself was already one of the most polluted rivers in the world. But suddenly clouds of polluted air were drifting hundreds of miles east to Beijing. When a reporter visited the region in late July, the air was so polluted that raindrops left black spots on car windshields.<sup>6</sup>

Factories and sewage facilities in Wuhai as well as other towns and cities dump their waste into the river with very few real attempts to treat the water, but some of the worst pollution comes not from factories, but from China's farmers. The waste from endless doses of fertilizers as well as from pig farms is channeled into the river, turning it into a virtual sewer that can sustain little if any life downstream.

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<sup>6</sup> Jim Yardley, "Crosscurrents: China's Path to Modernity, Mirrored in a Troubled River," in the *New York Times*, 19 November 2006.

The fact of the matter is that China is starved for water. The huge demand for water in China's growing cities coupled with a two-decade long drought have made the situation rather desperate, especially in north China in regions traversed by the Yellow River. Water shortages are at crisis level in many regions. About 400 of China's 600 cities lack an adequate supply for future growth, and many are now making do by draining underground aquifers to dangerously low levels. Some coastal cities are building very expensive desalination plants to turn seawater into drinking water. Over all, China has one of the lowest per capita water supplies in the world and one of the most uneven distributions of water. Northern China is home to 43 percent of the population, sixty-five percent of the nation's agriculture, but only 24 percent of the country's water supply.<sup>7</sup>

For several years during the 1990s, the Yellow River ran so low that it failed to reach the sea during parts of the year because so many people were draining it for local uses further upstream. Since then, engineers have corrected that problem, but the dams and dikes have accentuated a different one: the river is rising into the sky. The huge amount of sediment washing downstream is now pinched by so many dikes and interrupted by so many dams that it is pushing the bed of the river upward, which means as the river goes up, so must the height of dams to prevent floods.

*New York Times* reporter Jim Yardley writes:

For centuries, the Yellow River symbolized the greatness and sorrows of China's ancient civilization, as emperors equated controlling the river and taming its catastrophic floods with controlling China. Now, the river is a very different symbol — of the dire state of China's limited resources at a time when the country's soaring economic growth needs more of everything. "The Yellow River flows through all these densely populated parts of northern China," said Liu Shiyin, a scientist with the Chinese Academy of Sciences. "Without water in northern China, people can't survive. And the economic development that has been going on cannot continue."

To address that imbalance [of shrinking supplies of water in northern China], the government has begun work on a grandiose, and controversial, "South-to-North" transfer project, which would pump water along channels from the Yangtze River in southern China to replenish the country's thirsty north, including the Yellow River. Officials say they believe the plan, potentially the most expensive public works project ever in China, is the best hope for maintaining economic growth in the north, but critics point to practical and environmental concerns, and are fighting to block plans for a channel through Qinghai.<sup>8</sup>

The Yellow River truly represents the current and future problems that have come to haunt China. Growth has been amazing, but now China must somehow work to save its environment before there is a natural disaster of global dimensions. China has become the factory for the world, but it is fast becoming the major polluter as well. Just as its major river is rapidly dying, so is China's environment, and if little is done to rectify this problem, both the Yellow River and China itself might find itself on the brink of self-inflicted destruction.

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<sup>7</sup> Yardley, op. cit.

<sup>8</sup> Yardley, op. cit.

## China's Growing Dustbowl

A gruesome picture on the front page of the *Boston Globe* said it all: Headlined "China's dangerous dustbowl," one sees a brown picture of Chinese tourists attempting to cross Tiananmen Square, everyone trying to protect his face from the relentless biting sand everywhere. People only a few yards behind those close to the camera look like faint dark ghosts with a shadow of the Forbidden City looming ominously in the background. The air is full of dark brown sand. The caption reads "Chinese tourists in Beijing's Tiananmen Square use masks to protect against a sandstorm kicked up from the encroaching Gobi Desert, whose sands are now within 100 miles of the capital."<sup>9</sup>

Jehangir S. Pocha's in-depth dramatic reporting in the *Globe* describes a horror-show brewing in northern and western China, where "overgrazing, logging, and loss of groundwater turn nearly a million acres into desert every year, displacing millions and cutting global food supply." Current trends point to a pending global catastrophe. I got a taste of it when visiting Tokyo in May 2006 when cars near my downtown hotel were covered in a mustard-colored dust imported from China and now spreading as far as the west coast of North America.

Lester Brown, head of the Earth Policy Institute in Washington, D.C., notes: "People dusting off their cars in California or Calgary often don't realize the sand has come all the way from China. There is a dustbowl developing in China that represents the largest conversion of productive land to desert of any place in the world...and its affecting the world." China has always suffered from a dry climate and already a quarter of its landmass is composed of deserts--but the situation is progressively getting worse.

China has always suffered from aridity as twenty-five percent of its land mass, especially in western sections, consists of desert. But the situation is getting worse. Overgrazing, along with persistent drought, indiscriminate use of groundwater, and rampant logging are badly eroding the edges of China's deserts, allowing them to merge and spread. Recent satellite imagery shows that the Badain Jaran Desert in north central China is pushing southwards toward the nearby Tengger Desert to form a single, larger desert overlapping both northwestern Gansu Province and neighboring Inner Mongolia. These and other expanding deserts swallow almost a million acres of land a year. Soon, 40 percent of China could turn into scrubland, creating massive social, economic, and ecological challenges.

Across China it is estimated that 200 million people are badly suffering from the health and economic impacts of desertification. Breathing and skin disorders caused by the dust continue to rise, and falling crop yields are lowering incomes. It is said that in recent years over 4,000 villages, many of them quite small, have been swallowed up by the encroaching desert. Typically China, which is still self-sufficient in food, grows about 500 million tons of grain every year, but desertification coupled with growing urban sprawl are sharply cutting into China's arable land and it may not be too far in the future that China will once again have to begin importing grain to survive.

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<sup>9</sup> Jehangir S. Pocha, "China's dangerous dustbowl" in *The Boston Globe*, 18 September 2006, pp. C1+C3.

## The Effects of Industrial Pollution

Industrial pollution is also a major problem in China. A story in *The Wall Street Journal*<sup>10</sup> in early October, 2006, “A Poison Spreads Amid China’s Boom” tells an equally tragic story. Doctors treating a five year-old boy in the isolated mountain village of Xinsi in China’s western Gansu Province discovered high levels of lead in his blood. Subsequent tests of the other 250 children in the village revealed a very similar problem. All of them had highly elevated levels of lead in their bodies requiring the prolonged hospitalization of ten children and the prognosis that at least four are likely to have severe brain damage.

The World Health Organization (WHO) says that blood lead levels of 100 micrograms per liter of blood are causes for concern and that even slightly elevated levels can lead to neurological damage and reduced IQ. But the results for Xinsi point to numbers in the 300s and 400s, even 798. For a long time children in the village have complained about severe headaches, nausea, and other pains. Parents say that their babies’ teeth are growing black or not coming in at all. Parents and teachers note that many children are having memory and concentration problems.

The culprit? A factory near the mountain village made lead ingots used in manufacturing color television tubes and cables shipped across the world. It has also spewed out poisoned air containing 800 times the permissible level of lead emissions, further complicating the problem.

Lead in China is still very popular in manufacturing because it is cheap, plentiful, malleable and very resistant to corrosion. Lead compounds are often added to plastics and vinyl to make them able to resist high temperatures and because lead is itself very dense, it is often added to inexpensive metal products to make them seem more substantial than they are. I was surprised to learn that lead is on occasion even added to herbal products that are sold by weight to make them even heavier.

The Xinsi disaster shows in microcosm how vulnerable Chinese, especially children, are to the environmental damage inflicted by their nation’s rapid industrial growth. The result is a severe health crisis that could have effects on the whole generation of China’s young children. Xinsi may be comfortably located deep in the mountains, a full eight hour bus ride to the nearest city, Xian, but Chinese officials admit that even wealthier, more developed areas such as Shanghai and Guangdong Province in the south will see a rise in birth defects due to a nationwide deterioration of the environment.

The Xinsi disaster is emblematic of a far larger problem in China where a lack of pollution controls and enforcement of environmental laws has resulted in the pollution of China’s soil, water and air with not only lead, but also mercury and other pollutants, leaving children with very dangerously high levels of toxic metals in their blood. China is now facing a real dilemma concerning the future of its high-growth economy, whether it should stress short-term profits and allow for the long-term burden of human and environmental costs.

The Xinsi incident also shows how a news story of such grievous import is reported in China. When doctors in Xian discovered the 5-year-old boy’s high level of lead in his

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<sup>10</sup> Shai Oster and Jane Spencer, “A Poison Spreads Amid China’s Boom” in *The Wall Street Journal*, 1 October, 2006, p. 1A+6A.

blood, word got back to the village and other parents began having their children tested as well. A local newspaper in Xian ran a story about all of the parents getting their children tested for lead. This story was picked up by Xinhua, China's national news agency and thereby brought to the attention of China's central leadership. A national government investigative team is now investigating how the serious lead question was handled (or ignored) by local and provincial officials. The only positive element so far is the closure and partial dismemberment of the Xinshi factory that local officials allowed to keep going despite the fact that the factory was allowed to continue operating for years while grossly exceeding government pollution emissions standards.

Lead poisoning was a problem in the industrial West, especially in Britain during the heyday of the industrial revolution there. The United States became very conscious of the problems caused by lead poisoning in the 1960s and early 1970s when it was discovered that lead in gasoline and paint caused the hospitalization and deaths of many children each year. These deaths led to a wave of environmental legislation that has to a large extent solved the problem that China is only now beginning to face. Sadly, however, the problem has spread in a small way to the U.S. A small child in Minneapolis died in early 2006 after swallowing a metal charm made of lead in China that came as a "gift" with a pair of Reebok sneakers.

### **The Peril of Air Pollution in China**

China's dramatic economic advances have come at a terrible price--some of the worst pollution that the world has ever seen. The air in virtually all of China's cities is unhealthy to breathe and the water is unsafe to drink, even in major cities like Beijing and Shanghai. Even rural China is paying a heavy price for pollution. The cost of pollution is high both in terms of the great numbers of people who die each year due to pollution-related diseases, but also in terms of money. It is estimated that pollution costs the Chinese between seven and ten percent of their GDP each year. Despite an ever-growing fierce effort to combat pollution, the situation becomes worse each year, so bad that some fear that it might slow down or even eventually stop China's massive economic growth. Clearly, pollution is the most critical problem that the Chinese face today.

A few years ago I was driving an exchange student from China to Mary Baldwin College where I teach from Dulles Airport in northern Virginia. I was coming in on a little side road through the countryside near Staunton when the student woke up from her jet-lag induced slumber and suddenly shouted in amazement. "Stop the Car! Stop the Car!" She dashed out of my car and ran to the side of the road gazing up at the sky in amazement. She later explained that she had never seen so many stars or the moon so clearly in her native Beijing.

What she said is true. Our Fulbright group spent two full weeks in Beijing, and although we did have a few bright sunny days where the blue sky and white clouds were visible, when we looked up at night all we saw was a gray dark sky. Once I think that I did see the full moon, but it might have been some lights from a downtown skyscraper. I never did figure that one out. The stars are indeed quite bright in Staunton, but even there pollution is a problem because of smog that filters into the Shenandoah Valley from the Midwest. If the girl from Beijing had been able to visit our home in northern Vermont that straddles the Quebec border, she would have seen a brighter, even more beautiful radiant sky.

Pollution is a real problem in China. One of the most serious and negative consequences of China's rapid economic development in recent decades has been drastically increased pollution and degradation of natural resources. A 1998 report issued by the World Health Organization on air quality in 272 cities worldwide concluded that seven of the world's ten most polluted cities were in China. China's own findings on pollution in 338 of its cities found that two-thirds of them are moderately or severely polluted. Another survey found that sixteen of the world's twenty most polluted cities are in China with deaths from air pollution related causes estimated at over 400,000 or more every year.<sup>11</sup>

The pollution of China's cities is obvious to anyone who visits them. When I visited Chengdu, a city of ten million and the capital of Sichuan Province in western China in March 2005, I was told by a cheerful clerk one morning that I was lucky to have a sunny day. Donning my coat, I went outside to see a faint degree of sunlight filtering through the sky. The sun appeared as a big orange ball, but its power was mitigated by the thick layer of pollution in the sky. We had a supposedly sunny day in Shanghai just before visiting Chengdu, but the conditions were so bad that when I stood on the Bundt and looked across the river at the famous television tower, I could barely see it.

The trip to Shanghai and Chengdu was accomplished in late winter when the pollution is especially bad. Coal furnaces used to heat homes and businesses emitted smoke which hovered over the city like a giant curse reminiscent of the coal-induced fog that used to cause even nearby figures to disappear in London. My son David who spent a week in Beijing in late January, 2004, reported that the pollution there was so bad that he could not even see across the street when trying to cross a major downtown intersection.

Conditions are much better in the sweaty heat of summer when nobody is burning coal. While visiting Beijing and Shanghai in July 2006 I had no trouble seeing across major boulevards and the skyscrapers in Pudong were clearly visible from the Bundt. But still I never saw a star and barely saw the moon in urban China.

Residents of Beijing conduct their own tests every morning. An official at the American embassy in Beijing had us look out the windows from his high-rise office window over the city. It was a clear sunny afternoon in early July, a rare pristine day, and we could see the whole city sweeping below us as well as a distant range of mountains beyond the edge of the city. Our host told us that this was a rare treat, that on the average "good day" he could see buildings a few blocks away, but that on "bad days," especially in winter when the smog was especially thick, it is difficult to see the building next door. He added ruefully that the situation is going to get much worse before it gets better since there are a thousand new cars added to Beijing's streets every day.

I remember the terrible air in Tokyo when I lived there in the late 1960s. It was so bad that there were some days when one could literally see the vapors in the air, but today the air of Tokyo, while not pristine, is actually quite clean most of the time. A key factor here is a set of stringent regulations on automobile exhaust which is evidently not in force in Beijing. Sitting in an endless traffic jam on one of the highways ringing Beijing can really make your eyes water, even with the windows of one's car or bus closed. China lacks the severe air

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<sup>11</sup> Associated Press report on line, 15 February 2006.

pollution controls required of cars in Tokyo or California and it is said that owning a car in a big city is a major sign of prestige.

The people who breathe the polluted urban air of China suffer horribly. One of our Beijing guides told us that inhaling the foul air in Beijing or Shanghai was the equivalent of smoking two packs of cigarettes every day. When one considers how many Chinese also smoke heavily, one can only imagine the damage to their lungs. Tragically, respiratory diseases and heart disease related to air pollution are the leading causes of death in China. Severe incidences of acid rain fall on about a third of the country each year.

The fact that air pollution will get worse in China in years to come before it gets better is not due just to the huge addition of cars on China's roads each year. Coal makes up the bulk of China's fuel consumption and China is the largest producer and consumer of coal in the world. Indeed, nearly two-thirds (64 percent in 2002) of China's energy production is coal-related. Unfortunately, as China's economy continues to grow, so does demand for extra coal production and use. Although coal's share of China's overall energy production will decrease in percentage terms in years to come, coal consumption will continue to rise in absolute terms.

### **Coal, Air Pollution and the World's Most Polluted City**

Newspaper reports in early 2007 identified Linfen, an industrial city in Shanxi Province in north central China, as the world's most polluted city. Located in the toxic center of China's coal producing heartland, it is "an apocalyptic vision of clanking factories, spewing smokestacks, burning flames, suffocating fumes, slag heaps, constant haze and relentless dust."<sup>12</sup>

Geoffrey York, writing for the *Globe and Mail*, recounts how this city and China as a whole is suffering from an air pollution problem that in time will contribute massively to the problem of Global Warming:

On a winter morning, the smog is so thick that a visitor can barely see 100 metres ahead. Buildings disappear into the haze. The Buddhas in the ancient temples are black with coal dust. Even the sun is barely visible in the darkened sky. Linfen is a ghost city, inhabited by people who loom out of the smog like spectral presences.

Dust is choking the farmers and destroying crops, yet these might be the least dangerous of the coal industry's side-effects. From a global viewpoint, the most disturbing is one that China has largely ignored: the carbon dioxide that contributes massively to global warming.

Carbon dioxide is responsible for about 80 per cent of the world's human-generated emissions of greenhouse gases. Most of this comes from coal, and China is responsible for 90 per cent of the rise in world coal consumption in recent years. This country is hooked on coal. With 21,000 coal mines across the country, it is cheaper and more easily available than any other form of energy in

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<sup>12</sup> Geoffrey York, "A Canary in the Chinese Coal Mine" in the (Toronto) *Globe and Mail*, 3 February 2007.

China. It is the lifeblood of its booming economy, producing 70 per cent of the energy that fuels its dramatic growth.

Coal is the biggest reason for China's rapid climb to the top ranks of the world's worst contributors to global warming. The latest projections show that China will overtake the United States to become the world's top producer of carbon dioxide by 2009, nearly a decade quicker than projected in previous studies. China will soon produce 20 per cent of all the carbon dioxide on the planet.

Yet China's impact on the global environment is rarely debated here.

"In China, global warming is not under discussion at all," says James Brock, an energy analyst and consultant in Beijing. "China is 10 to 15 years behind the United States on this issue."

Of course, the West has been guilty of many of China's bad environmental habits, too. The average Canadian, for example, consumes far more energy than the average Chinese and is responsible for releasing far more carbon dioxide. But with China's massive population, and its reluctance to enforce the use of modern anti-pollution equipment, China is quickly catching up to the industrialized world as a cause of global warming.

China is officially striving to restrain the rapid growth of its coal consumption, but mainly because of concern for its coal reserves, not because of the global-warming issue. And its efforts so far have been weak and ineffective. Even when it shuts down an illegal coal mine, the mine is often reopened by local workers and businessmen who don't want to lose the revenue.

China aims to limit its coal production to 2.6 billion tonnes by 2010, a moderate rise from the 2.3 billion tonnes it produced last year. But this target is certain to be missed, Mr. Brock says. He expects China's coal production to hit three billion or even 3.2 billion tonnes by 2010. And he expects China eventually to produce twice as much carbon dioxide as the United States.

"China is going up the intensity curve in its energy use, and it has four times the population of the United States," he says. "Coal is what China has, and people use what they have."<sup>13</sup>

The situation will eventually get much worse. China has said that it will limit its coal production by 2010 to 2.6 billion tons a year, up slightly from 2.3 billion tons in 2006. Today the United States produces more carbon dioxide than any other country including China, but in time China will be producing twice as much as the US.

Unfortunately, China and other developing countries are exempt from the Kyoto Protocol's rules for cutting the production of greenhouse gasses. They argue strenuously that they should be allowed the same historical privileges that allowed the older industrial nations to develop their economies, even if it means a sharp increase in global-warming gasses over the next decade or two. Sadly, China, like India and other developing countries, has always seen the environment as something that can be sacrificed to the god of economic growth.

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<sup>13</sup> York, *op. cit.*

There has already been severe international criticism of China's approach to global warming, and the Chinese are fighting back accusing the West and Japan of "environmental colonialism" by transferring their resource-intensive industries to China.

China's efforts at improving the environmental efficiency of its coal use is far behind the rest of the industrialized world. China's environmental spending is often antiquated or malfunctioning. Only 20 percent of China's coal-fired power plants are using scrubbers, as opposed to a third in the United States. And with the economy booming, the government is planning on building another 500 coal-fired plants, on top of the 2,000 that already exist. And China is very inefficient in its use of energy. China consumes three times more energy for every dollar of national output than the global average.

Chinese officials admit that they have badly failed in efforts to reach official targets for reducing pollution and cutting energy consumption. It lags far behind in its international ranking on environmental quality—and acknowledges that it has failed to tackle the global warming issue in any serious way. Incredibly, China is still consuming 40 percent of the world's coal production, more than Europe, Japan and the US. And in the next two decades China will account for more than one-third of the increase in greenhouse gasses.

Geoffrey York reports that "the pollution in Linfen is so bad that the red lanterns are black sometimes with soot. Cars turn on their headlamps in the daytime. Nobody wears a white shirt because it soon becomes grey. Half of the local drinking wells are polluted and unsafe. Elderly people stay indoors, afraid to breathe the air on the streets. Young children have grown up without ever seeing the stars at night because of the haze. Medical clinics in Linfen are filled with patients who suffer bronchitis, pneumonia, and other respiratory illnesses. Many people have a permanent cough, and their lungs and eyes ache. 'If you hate someone and want to punish him,' the Chinese media say, 'arrange for him to live in Linfen.'"<sup>14</sup>

China's drive for high economic productivity is already killing its own people in droves. An estimated 400,000 people die prematurely in China because of respiratory illnesses caused by air pollution and in the long run the whole world is going to pay a heavy price. Even if the United States and other industrial countries manage to diminish their pollution, their efforts will be for naught unless China does something to curb its production of dirty air.

### **The Danger of Water Pollution**

Water pollution is another critical problem in China. Tourists are strongly urged to use bottled water on all occasions, even for brushing one's teeth. One day when I was in a hurry in our Beijing hotel, I carelessly brushed my teeth using tap water and later that day I paid the price with a monumental and embarrassing case of the runs. Almost all of China's rivers are considered polluted to some degree and about ninety percent of the urban water bodies are severely polluted. Because only 278 of China's 661 major cities have sewage treatment plants, over 70 percent of the country's rivers are severely polluted.

A lot of the water pollution is caused by raw sewage. In most urban areas less than fifty percent of urban sewage is treated and in most areas raw sewage and industrial effluent runs into lakes and rivers. When you drive around Shanghai one notices canals that stink and

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<sup>14</sup> York, *op. cit.*

fester and in rural areas huge stretches of rural land are piled high with construction materials and other waste.

During November, 2005, there was a huge chemical spill near the city of Harbin in the Songhua River. The spill forced Harbin, a major industrial center in extreme northern China to shut down its water supply and it sent toxins into Russia, causing a major crisis in Sino-Russian relations.

Access to water is another critical problem in China. The struggle for adequate supplies of water will be one of the most difficult problems of this century, and there are few places where the problem will be as acute as China. The problem will be most difficult in normally arid northern China. Beijing, which sits on the edge of a desert and has a rapidly growing population, is rapidly depleting its underground water supply.

Just look at the case of the Yellow River which when we encountered it high up on the Tibetan Plateau was full of energetic water flow, but so much water is diverted from the river today that during the summer it fails to reach the sea. And yet China's second longest river may even face a worse water shortage in years to come. Research conducted recently by the Yellow River Water Resource Committee showed that by the year 2010, 2030 and 2050, the use of water from the river, for various things like industry and agriculture, will reach respectively 54, 65 and 73 billion cubic meters, much larger than the current 49 billion cubic meters. With the average annual water-flow volume of only 58 billion cubic meters, the Yellow River is now suffering from a severe water shortage problem and for the first time in history it has begun to run out of water during the dry season.

In order to solve the water shortage problem in areas along the Yellow River, China has been considering a huge project to channel water from the south to the north. This South-North Transfer Project, a \$62.5 billion plan to move 50 billion cubic meters of water via three new diversion projects from the Yangtze River in the center of the country to the North China Plain. Building is well under way, but there is great fear that moving the already badly polluted water of the Yangtze to the Plain will also introduce a whole host of new toxic pollutants to the breadbasket of China.

The Chinese government is acutely aware of the damaging effects of pollution both for the present and future. It has upgraded its State Environmental Protection Administration into a cabinet-level post and is largely increasing the amount of money spent on environmental protection. There are plans to reduce total air emissions of pollutants by ten percent in the near future and some cities have proudly announced that their air quality has begun to improve. Beijing, the host of the 2008 summer Olympics, is making a special effort to deal with the air pollution problem.

The role that the Three Gorges Dam on the Yangtze River has generated considerable controversy of late. Critics say that erosion and silting of the river by the dam will cause the destruction of several species of wildlife including fish, but the government counters with the argument that the dam will prevent the devastating floods that the river is famous for. Furthermore, the huge amounts of clean hydroelectricity generated by the dam will lessen the region's dependence on coal, thus reducing air pollution.

But pollution will continue to grow as a problem as China becomes more and more of an urban society. China is home to the world's largest ever migration of humans as tens of

millions of Chinese move from the farm to the cities in search of a better life. According to some estimates, China, which in 2006 had an urban population somewhere between 550 and 600 million, could possibly have an urban population approaching 900 million by 2020. The factories, cars and power plants that serve the people of these areas will make China's pollution problem that much worse, but there are faint signs of hope as China is beginning to come to grips with its deepening environmental problems. One experiment that has gone beyond the mere planning stage is the creation of an "ecopolis," a modern environmentally friendly "green" city near Shanghai.

What, one may ask, can China do to better conserve water? The answer, sadly, is not much. Chinese per capita use of water is only one-eighth that of Americans, and as Chinese bring in such modern conveniences as flush toilets, water use will only increase.

The fact that there is currently a major drought in many parts of China is certainly no help either.

### **Dongtan: China's Visionary Ecopolis --An Answer to its Environmental Crisis?**

Visitors to Shanghai today are treated to breathtaking views of a futuristic city. Its Pudong district, which just a generation ago was mostly farmland and a few old factories, today has a collection of ultra-modern skyscrapers designed by some of the world's most distinguished architects as well as the world's fastest and first commercially operating magnetic-levitation train which when completed will make the ride from Pudong airport to the center of town in just a few minutes. Just as remarkable are plans to build the world's first Ecopolis on an island not far from Shanghai.

The city, to be called Dongtan, will be located on Chongming island at the mouth of the Yangzi River not far from China's largest city, Shanghai. The plan is to begin moving the first residents sometime in 2011 or 2012. Dongtan would be self-sufficient in water and energy and would generate little if any carbon emissions. Gasoline and diesel vehicles would be banned in favor of solar powered boats and fuel-cell driven buses.<sup>15</sup>

Chongming island, despite its close proximity to one of the world's largest and fastest growing cities, is semi-rural or rural with scattered farming and fishing villages.

The plan is to build Dongtan amidst the rice paddies and crab ponds at the eastern end of the island that will in time become home first to tens and then hundreds of thousands of people. By the year 2040 there should be a million residents in the new city, The center of the island, which today has but few trees, would experience the mass planting of trees to create a new forest. Agriculture would become entirely organic and the islands vast tidal wetlands would become a nature preserve for birds and other creatures.

Plans call for energy to come from giant wind turbines and bio-fuels made from agricultural waste. Most of the city's rubbish would be recycled and human sewage would be processed and used for irrigation. Food would be produced without the use of any chemicals. A combination of a new expressway, bridges and tunnels would connect the island with Shanghai, allowing its residents to visit the island's green expanses since there are very few parks and green spaces in Shanghai itself.

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<sup>15</sup> Background information for this section is derived from a news report in the *China Daily* of 5 January 2004 and "Visions of Ecopolis" in *The Economist*, 23 September 2006, pp. 20-23.

Dongtan would not be a mere bedroom community for Shanghai. On the contrary, the city planners hope to attract research laboratories, technology companies, and call centers and to develop commercial exhibition centers. It would be a major center for scientific and technological research and a working model for other city planners both within China and around the world to examine.

### Concluding Notes

The big question here is whether pollution will undermine or even eventually destroy China's record pace of sustained economic growth. Like so many developing countries, China's primary concern is to improve living conditions for its entire population and it appears that at least for the short term, pollution will worsen as cities continue to grow at record paces. The World Bank estimated in 2004 that pollution is costing China 8-12% of its \$1.4 trillion GDP in direct damage.<sup>16</sup> But at the same time it is hardly realistic to ask Chinese to stop buying and using cars and building new coal-generated power plants to provide electricity for the bigger cities. China will simply keep up its mad pace of development, but as we see with plans for the city of Dongtan, the Chinese have begun to consider their future more carefully.

A major problem in the effort against destruction of the environment is the lack of money. It costs money to enforce laws and to build new clean efficient industries, cars and power stations, but all levels of Chinese government are financially strapped. Where is the new money to come from and how does one force polluters to stop. One very clear solution is to make the violators pay heavy fines for their misdeeds and to use the money generated to improve the environment, but the enforcement authorities just cannot keep up with the magnitude of the problem.

There is also the question of further economic growth versus increased environmental vigilance. One can shut down power plants that use coal, but then a town or city will be without power for its residents and factories. The truth is that China remains a poor country and it simply cannot pay for all of its environmental problems.

Increased help from abroad is needed, but the overall problem is too big for a rapid solution.

*New York Times* columnist Thomas L. Friedman, who visited Beijing in 2007, is correct when he notes:

China's officials are not in denial about their environment. But they also have not come fully to grips with how big a project it will be to take this incredible locomotive of an economy and clean up the engine without stopping the train. I would argue that the same kind of bruising effort it took for Deng Xiaoping to move China from communism to capitalism will be required to move China from its polluting model of capitalism to a sustainable one. Mao almost destroyed China with his Cultural Revolution to make it more red, more communist. Without a new cultural revolution to make China more green, more sustainable, the Chinese growth juggernaut will destroy itself....But moving this place to a new sustainable model will take more than ordinary leadership. It will take a

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<sup>16</sup> "China's Precarious Environment" in *The Economist*, 21 August 2004.

giant leader who by sheer force of will moves the system against all the entrenched habits and interests. It will take a green Deng Xiaoping. Nothing else will suffice. Otherwise every day here will feel like midnight at noon.<sup>17</sup>

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<sup>17</sup> Thomas L. Friedman, "The Green Leap Forward" in *The New York Times*, 15 February 2007, p. A31.