

Soil Pollution in China: Growing Tiger, Hidden Dragon

Taggart Bonham
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ABSTRACT

China's rapid period of industrialization planted the seeds of rural pollution. Toothless environmental safeguards coupled with a lack of government transparency and economic incentives catalyzed the dramatic rise of pollution levels. The government has finally begun to admit the perils of soil pollution and drafted a soil action plan to begin combatting polluted farmlands in 2017. Specifically, China recently banned cultivation on contaminated acres in order to neutralize the land's chemical balance. As Lao Tzu said, "A journey of 1000 miles begins with a single step." At least China's first step is in the right direction.

INTRODUCTION

Mass famines. Food riots. Resource scarcity. These dystopian futures are inevitable unless China stops polluting their soil. China's communist government was founded during a revolution against imperialism, so relying on foreign agricultural imports would be ironic. Sixty million acres, roughly 20% of China's arable land, is contaminated. China is unable to grow enough food to feed its growing population.¹ While other media starlets like air and water pollution are being actively fought; until recently, China's last environmental legislation against soil abuse was in 1989.²

China's soil pollution links back to imperialism, communism, and industrialization. Pre-Mao China was the pie that the hungry imperialist world carved into hearty slices. Sick of mistreatment, the communists revolted against foreigners and Chinese nationalists to establish a government. With a rapid increase in factory production, China industrialized into a leading global exporter. Their harvest is now severely impacted due to their disregard for environmental consequences.³ Factories' CO₂ emissions, chemical dumping, and other pollutants are absorbed into farmland and produce inedible crops.

China is a revealing case study for soil pollution. First, their sudden economic development allows an unprecedented view into the environmental consequences of rapid growth. Second, China is the ideal breeding ground for rural pollution because it lacks both transparency as well as effective

regulatory measures particularly in areas of rural farmland.⁴

HISTORICAL CONTEXT

The seeds of soil pollution were planted during China's transformation into a manufacturing behemoth. In 1958 Mao Zedong instituted the Great Leap Forward in an attempt to modernize his country. He dictated that farmers must redirect their efforts from farming to producing steel by melting down household metals in backyard furnaces. As more and more farmers stopped farming, crop production was nearly halted and a massive famine ensued. Thirty million people died.⁵ China's first attempt at industrialization was not a success as its 'leap forward' was a lurch backward.

A decade later, Deng Xiaoping assumed control of China and evangelized economic reform. In a negative turning point for China's soil pollution, Deng led China to industrial greatness. In 1970 Deng implemented his Socialist Market Policy, thereby unleashing a forty-year period of growth without environmental consideration. Deng also opened several Special Economic Zones along the coast to boost China's exports. These regions attracted significant foreign investment that fueled China's rapid growth.⁶ The resulting increase in manufacturing turned China into an export-led country and drove its economy to become the world's second largest.

During the development of industrial China, soil pollution grew unchecked for decades because the Chinese government lacked transparency on this issue. In 2006 the government's official soil pollution study

¹ Josh Chin and Brian Spegele, "China Details Vast Extent of Soil Pollution," *The Wall Street Journal* (New York), April 17, 2014, accessed May 15, 2015, <http://online.wsj.com/>.

² Huasun Qin, "China - Country Profile," *United Nations*, <http://www.un.org/>.

³ R. Monastersky, "China's Air Pollution Chokes Crop Growth," *Science News* (Washington, D.C.), March 27, 1999, accessed May 15, 2015, <http://www.questiaschool.com/>.

⁴ Elizabeth C. Economy, "Congressional Testimony: China's Environmental Challenges," Council on Foreign Relations, last

modified September 22, 2004, accessed May 15, 2015, <http://www.cfr.org/>.

⁵ Jasper Becker, *Hungry Ghosts: Mao's Secret Famine* (New York: Holt Paperbacks, 1998), 270-4.

⁶ Jin Wang, "The Economic Impact of Special Economic Zones: Evidence from Chinese Municipalities" (London School of Economics, London, November 2009), accessed May 15, 2015, <http://se.shufe.edu.cn/>.

marked the first positive turning point for the land. Launched with great fanfare, this study was to comprehensively detail the current status of China's soil. Unfortunately, the results were never made public under the guise of needing to conduct more research. Many speculate the reason for secrecy is that the outcome mirrored the government's worst nightmare. A leading Chinese blog remarked, "Covering this up only makes people think: I'm being lied to."⁷ This survey proved China's opacity allows issues to worsen by blinding the public from the severity of the situations because it is impossible to solve an undefined problem.

SOLUTIONS

China's desire for economic growth drives China's pollution problem. Since the inception of Deng's Socialist Market Policy, investing in profitable enterprises has taken precedence. An Environmental Protection Minister even reasoned, "At the primary stage of socialism, slowing or halting economic development for environmental protection [i]s not acceptable."⁸ Rural officials lure industrialists to build factories in their districts with readily available cheap land and tax incentives. This seemingly win-win situation jeopardizes China's land and food security. Local officials boost growth, output, and job opportunities in their area. Factory owners create profitable businesses with subsidized land and cheap labor. But, running factories next to farms causes, "fruit trees to stop bearing fruit," and "even the insects" to flee, according to a farmer from Dapu, China (大埔县).⁹ Due to farmers' complaints, factories now pay them a pollution-remuneration settlement. As long as farmers continue planting, they will be

paid roughly half of their original salary. Subsequently, farmers often move to factories for a higher salary. The singular emphasis on industry creates a vicious downward spiral that harms China's future food security.

The central government created a system that continues to result in a predictable set of behaviors. City leaders push factories beyond their city limits, often next to farms, to improve air quality for their residents. Rural officials reward factories for moving into their areas.¹⁰ This migration does not fix pollution; it only transfers accountability to rural 'comrades'. Additionally, smaller rural governments are incapable of regulating factories. This inappropriate reward system exacerbates soil pollution.

Irresponsible farming intensifies rural pollution. Feeding a growing population with a shrinking number of farmers drives many shortcuts. For example, data illustrates that fertilizers are grossly overused. Crops absorb as little as 35% of the fertilizers, and the rest runs off to contaminate nearby water and soil.¹¹ Unused nitrogen fertilizer increases soil acidity and lowers crop production overtime. China's growth-driven mindset combined with inadequate policies, and irresponsible farming are regional challenges to this problem.

None of China's past environmental efforts has significantly reduced soil pollution. In 1979 China passed the Environmental Protection Law on a trial basis. In 1989 this hollow law was enacted countrywide. Chinese blogger Charles McElwee critiqued, "[the bill] hangs on China like an ill-fitting suit: too tight here, too roomy there;

⁷ "Soil Survey," *People's Daily Online* (blog), accessed May 15, 2015, <http://english.people.com.cn/>.

⁸ Lu An, "Official Warns Environmental Pollution No Longer Acceptable," news release, accessed May 15, 2015, <http://english.gov.cn/>.

⁹ Chin and Spegele, "China's Bad Earth."

¹⁰ Ibid.

¹¹ Josh Chin and Brian Spegele, "China's Bad Earth," *The Wall Street Journal*, July 27, 2013, accessed May 15, 2015, <http://online.wsj.com/>; "Long-Term Effects of Nitrogen Fertilizers on Soil Acidity" (working paper, University of Wisconsin, Madison, n.d.), 3, accessed May 15, 2015, <http://www.soils.wisc.edu/>.

succeeding only in making everyone uncomfortable and requiring a set of temporary fixes.”¹² Lacking confrontational teeth, this law only exists to mollify environmental critics.

However, the smoke may be clearing over the paddies. Realizing soil pollution cannot remain hidden forever, China broke precedent on April 24th of this year when its top legislative body ratified the new Soil Protection Plan. This law includes far stiffer punishments for factories, names June 5th as Earth Day, and “declares war” against soil pollution.¹³ The old law only fined violating factories once, and the fine was so inexpensive that polluters quickly paid it off as a tax of doing business and continued production. The new law fines factories on a daily basis until they rein in their soil pollution to a sustainable level.¹⁴ This plan is a step in the right direction, but it needs to be successfully implemented to fully restore China’s land.

Various organizations attempt to solve China’s soil problem. The Congressional Executive Commission on China is working to promote transparency and share knowledge with China about pollution solutions.¹⁵ China Dialogue, a leading environmental organization, attempts to promote media-awareness about environmental issues in China.¹⁶ Despite their effort, these groups have only proposed ideas and raised awareness. They struggle to create lasting change due to Chinese censorship laws and lack of transparency.

Sadly, the U.N. has yet to recognize this issue. Without relevant data and proper recognition, problem solving becomes significantly harder.

ANALYSIS

A growing Chinese economy can support the economic solutions to curb this problem. Green practices must be incentivized as industrialization was. If taxes on pollution were so high that pollution-based businesses became unsustainable, owners would be financially motivated to change their practices to save money. Additionally, China could implement a clean-food tax for about \$150 USD / person. With phytoremediation, the use of living plants to remove contaminants from soil, land, and water, fully decontaminating one acre of polluted land would cost approximately \$50,000 USD.¹⁷ Remediating all of China’s polluted land would cost three trillion dollars (\$50,000/acre * China’s 60 million polluted acres).¹⁸ Completing the remediation in twenty years would cost 150 billion dollars a year (\$3T/20 years), costing each Chinese citizen the equivalent of \$155.38 USD a year to have access to clean and plentiful food (\$6B/year/1.3B citizens). This tax is inexpensive and feasible because it represents only 1.5% of an average Chinese citizen’s yearly income (\$4.61/\$9,844 China’s per capita GDP).¹⁹

In addition to these economic solutions, there are also cheaper political and social solutions. First, the Chinese government must admit there is a clear and present problem. They must embrace transparency by publishing

¹² Charles McElwee, "Shaping China's Green Laws," China Dialogue, last modified July 7, 2011, accessed May 15, 2015, <https://www.chinadialogue.net>.

¹³ Zhongxi Ren, "China's Legislature Adopts Revised Environmental Protection Law," *China Central Television*, April 24, 2014, accessed May 15, 2015, <http://english.cntv.cn/>.

¹⁴ Jost Wübbeke, "The Three-Year Battle for China's New Environmental Law," *China Dialogue*, April 25, 2014, accessed May 15, 2015, <https://www.chinadialogue.net>.

¹⁵ *Transparency in Environmental and Climate Change in China: Roundtable Before the Congressional - Executive Commission On*

China, One Hundred Eleventh Congress, Second Session, April 1, 2010. Washington: U.S. G.P.O., 2010.

¹⁶ "相关" [About], China Dialogue, accessed May 15, 2015, <https://www.chinadialogue.net/>.

¹⁷ Angela R. Bielefeldt, PhD, PE, "Bioremediation: Phytoremediation," last modified 2008, PDF.

¹⁸ James T. Areddy, "Data Illustrate Poor State of China's Soil," *The Wall Street Journal* (New York), December 30, 2013, <http://online.wsj.com/>.

¹⁹ "GDP per Capita," World Bank, accessed May 15, 2015, <http://data.worldbank.org/>.

their soil study data in order to allow organizations access to the specific information necessary to help solve this issue. Second, concerned citizens and farmers must protest offending factories. Mr. Chin, reporter for *The Wall Street Journal*, wrote to me, “[protests] have been successful in shutting down petrochemical facilities in some cities recently.”²⁰ Through use of Chinese social media sites such as Sina Weibo or QQ, protests could be organized and radical change could occur.²¹ Additionally, using citizens as rural regulators would further stymie soil pollution. Citizens could monitor nearby factories. Their local reporting would hold factories to higher standards.²² Finally, farmers should be educated by agents from the Environmental Ministry about the proper use of fertilizers. If nitrogen fertilizers were used more reasonably, contaminated run-off would not taint nearby land. Logically, farmers should be held to the same environmental standards as factories. Unlike my proposed economic solutions, these political and social solutions would be inexpensive and could be readily implemented.

The hardest part in curbing soil pollution is changing China’s culture from one of short-term gains to one of long-term sustainability. In the past 30 years, China transformed from an economic miracle into an environmental disaster. In order to feed its rapidly growing population for generations to come, China must revive contaminated lands and make an effort not to further pollute its soil. Although this remediation would be costly, China relies on minimal imports, and failure to grow enough food could threaten the legitimacy of the regime.²³ With China’s new

Environmental Protection Plan along with my measures, there would be major potential for significant change to occur. As Lao Tzu said, “A journey of 1000 miles begins with a single step.” At least China’s first step is in the right direction.

²⁰Josh Chin, "Re: Follow-Up Question on China's Bad Earth," e-mail message to author, July 27, 2013.

²¹ Think Arab Spring, but instead possibly called Rice-Paddy Fall.

²²The U.S. Embassy in Beijing began releasing local air quality data much to the dismay of the Chinese Government. Similarly,

concerned citizens could monitor metal-levels and report factories, which are aggravating this serious problem; "U.S. Embassy Beijing Air Quality Monitor," Embassy of the United States in Beijing, accessed May 15, 2015, <http://beijing.usembassy-china.org.cn/>

²³ Chin and Spegele, "China's Bad Earth."

ANNOTATED BIBLIOGRAPHY

An, Lu. "Official Warns Environmental Pollution No Longer Acceptable." News release. Accessed May 5, 2014. <http://english.gov.cn/>.

This press release from the Chinese Government informs that top government officials no longer sanction environmental pollution as a byproduct of economic growth. Posted on the Chinese Government's webpage, this article provides powerful rhetoric against local officials allowing pollution when produce goods. Because the Chief of Environmental Protection issued this statement, there is bias towards environmentalism in this release. As this article was written 6 years ago and no significant measures have been subsequently implemented, it is useful to my paper because it proves how there is not enough being done. Additionally, it corroborates despite the Mr. Chin and Spegele's (co-authors of *China's Bad Earth*) point about top government officials deride pollution, but corrupt local officials have no monetary incentive to reduce pollution, so they remain unmoved.

Chin, Josh, and Brian Spegele. "China's Bad Earth." *The Wall Street Journal* (New York, NY), July 27, 2013. Accessed May 5, 2014. <http://online.wsj.com/>.

This editorial provides a thorough examination of the causes of rural pollution in China and effects of rapid industrialization on both their food supply and the legitimacy of their government. The authors provide numerous relevant facts and case studies on the effects of factories' pollution in agricultural towns. This article explains regional factors that allowed rural pollution to perpetuate. As the authors wish to raise awareness about the issue, the extent to which Chinese crops are polluted may have been overstated and biased in that regard. This article is the basis for my paper as it concisely describes the causes and effects of this crucial issue. This article is significant to my paper because it provides many crucial facts, which are difficult to attain due to Chinese censorship on pollution.

Transparency In Environmental and Climate Change In China: Roundtable before the Congressional-Executive Commission On China, One Hundred Eleventh Congress, Second Session, April 1, 2010. Washington: U.S. G.P.O., 2010.

This Congressional Testimony discusses whether China is meeting its stated environmental commitments, and if China has mechanisms to encourage pollution data transparency. This roundtable further examines China's systems for measuring, monitoring, and reporting energy and climate data. Because the speakers here testified before Congress, there is bias towards encouraging diplomacy. The orators may have been reserved and polite in towards China in this discussion to kindle national-partnership. This discussion is useful to my paper because it provides creative ways the U.S. can help China reach its environmental goals. Additionally, it is significant to my paper because it view on China's pollution with Chinese government propaganda filtered out.

Zhao, Huanxin, and Wencong Wu. "Tainted Farmland to Be Restored." *China Daily* (Beijing, China), December 31, 2013. Accessed May 5, 2014. <http://infoweb.newsbank.com/>.

This article outlines China's new soil pollution policy. This story further explains China's new system for rehabilitating farmland, including which areas are now banned from growing crops and the data behind the current number of arable hectares. Finally, this source touches upon the still-unreleased soil-survey from 2006-2010 informing that results will be made public when there is more data. This article is useful to my paper because it provides breaking news on the measures China hopes to employ to curtail rural pollution. Additionally, it adds further significance to my paper because it contains useful facts about China's current use of land.